VIVISECTION.

HEARING

BEFORE THE

SENATE COMMITTEE ON THE DISTRICT OF COLUMBIA,

FEBRUARY 21, 1900,

ON THE BILL (S. 34) FOR THE FURTHER PREVENTION OF CRUELTY TO ANIMALS IN THE DISTRICT OF COLUMBIA.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1900.

COMMITTEE ON THE DISTRICT OF COLUMBIA,
Washington, D. C., February 21, 1900.

The subcommittee met at 10 a. m.

Present: Senators Gallinger (chairman of subcommittee), Pritchard, and Kenney.

Senator GALLINGER. This meeting has been called for the purpose of considering Senate bill No. 34, the title of which is "A bill for the further prevention of cruelty to animals in the District of Columbia," commonly known as the antivivisection bill—a title that I did not give it, but which has passed current for two or three years throughout the country.

If no one desires that the bill shall be read, I will have it inserted in the minutes of these proceedings. Without objection, that order will be made.

The bill is as follows:

A BILL for the further prevention of cruelty to animals in the District of Columbia.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter no person shall perform on a living vertebrate animal any experiment calculated to give pain to such animal, except subject to the restrictions hereinafter prescribed. Any person performing or taking part in performing any experiment calculated to give pain, in contravention of this act, shall be guilty of an offense against this act, and shall, if it be the first offense, be liable to a penalty not exceeding one hundred and fifty dollars, and if it be the second or any subsequent offense, shall be liable, at the discretion of the court by which he is tried, to a penalty not exceeding three hundred dollars, or to imprisonment for a period not exceeding six months.

SEC. 2. That the following restrictions are imposed by this act with respect to the performance on any living vertebrate animal of an experiment calculated to give pain to such animal; that is to say:

(*a*) The experiment must be performed with a view to the advancement by new discovery of physiological knowledge or of knowledge which will be useful for saving or prolonging life or alleviating suffering; and

(*b*) The experiment must be performed by a person holding such license from the Commissioners of the District of Columbia as in this act mentioned, or by a duly authorized officer of the Government of the United States, or of the District of Columbia; and

(*c*) The animal must, during the whole of the experiment, be completely under the influence of ether or chloroform sufficiently to prevent the animal from feeling pain, excepting only that in so-called inoculation experiments or tests of drugs or medicines, the animal need not be anæsthetized nor killed afterwards, nor in tests of surgical procedure need animals be kept completely anæsthetized during the process of recovery from the surgical operation. Otherwise than this the animal must be kept from pain during all experiments; and

(*d*) The animal must, if the pain is likely to continue after the effect of the anæsthetic has ceased, or if any serious injury has been inflicted on the animal, be killed before it recovers from the influence of the anæsthetic which has been administered; and

(*e*) No experiment shall be made upon any living creature, calculated to give pain to such creature, in any of the public schools of the District of Columbia; provided as follows, that is to say:

First. Experiments may be performed under the foregoing provisions as to the use of anæsthetics by a person giving illustrations of lectures in medical schools, hospitals, or colleges, on such certificate being given, as in this act hereafter mentioned, that the proposed experiments are absolutely necessary for the due instruction of the persons to whom such lectures are given, with a view to their acquiring physio-

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logical knowledge or knowledge which will be useful to them for saving or prolonging life or alleviating suffering; and

Second. The substance known as urari or curare shall not, for the purposes of this act, be deemed to be an anæsthetic; and

Third. Notwithstanding anything in this act contained, no experiment calculated to give pain shall be performed on a dog or cat, except upon such certificate being given, as in this act mentioned, stating, in addition to the statements hereinbefore required to be made in such certificate, that for reasons specified in the certificate the object of the experiment will be necessarily frustrated unless it is performed on an animal similar in constitution and habits to a cat or dog, and no other animal is available for such experiment; and, an experiment calculated to give pain shall not be performed on any horse, ass, or mule, except on such certificate being given, as in this act mentioned, that the object of the experiment will be necessarily frustrated unless it is performed on a horse, ass, or mule, and that no other animal is available for such purpose; and

Fourth. Any exhibition to the general public, whether admission be on payment of money or gratuitous, of experiments on living animals calculated to give pain shall be illegal.

Any person performing or aiding in performing such experiment shall be deemed to be guilty of an offense against this act, and shall, if it be the first offense, be liable to a penalty not exceeding one hundred and fifty dollars, and if it be the second or any subsequent offense, shall be liable, at the discretion of the court by which he is tried, to a penalty not exceeding three hundred dollars, or to imprisonment not exceeding six months; and any person publishing any notice of any such intended exhibition by advertisement in a newspaper, placard, or otherwise, shall be liable to a penalty not exceeding ten dollars.

A person punished for an offense under this section shall not for the same offense be punishable under any other section of this act.

SEC. 3. That the Commissioners of the District may insert, as a condition of granting any license, a provision in such license that the place in which any such experiment is to be performed by the licensee is to be registered in such manner as the said Commissioners may from time to time by any general or special order direct: *Provided*, That every place for the performance of experiments for the purpose of instruction shall be approved by the said Commissioners and shall be registered in such manner as the said Commissioners may from time to time by any general or special order direct.

SEC. 4. That the Commissioners of the District, upon application as hereinafter prescribed, may license any person whom they may think qualified to hold a license to perform experiments under this act: *Provided only*, That a license shall not be granted to any person under the age of twenty-five years, unless he be a graduate from a medical college, duly authorized to practice medicine in the District of Columbia.

SEC. 5. That the Commissioners of the District may direct any person performing experiments under this act from time to time to make reports to them of the methods employed and the results of such experiments, in such form and with such details as the said Commissioners may require.

SEC. 6. That the President of the United States shall cause all places where experiments on living vertebrate animals are carried on in the District of Columbia to be from time to time visited and inspected without previous notice for the purpose of securing compliance with the provisions of this act; and to that end shall appoint four inspectors, who shall serve without compensation, and who shall have authority to visit and inspect the places aforesaid, and who shall report to the President of the United States from time to time the results of their observations therein, which shall be made public by him.

SEC. 7. That any application for a license under this act, and for a certificate to be given as in this act mentioned must be signed by three physicians duly licensed to practice and actually engaged in practicing medicine in the District of Columbia, and also by a professor of physiology, medicine, anatomy, medical jurisprudence, materia medica, or surgery in the medical department of any duly established reliable school or college in the District of Columbia: *Provided*, That when any person applying for a certificate under this act is himself one of the persons authorized to sign such certificate, the signature of some other of such persons shall be substituted for the signature of the applicant.

A certificate under this section may be given for such time or for such series of experiments as the persons signing the certificate may think expedient.

A copy of any certificate under this section shall be forwarded by the applicant to the Commissioners of the District, but shall not be available until one week after a copy has been so forwarded.

The Commissioners of the District may at any time disallow or suspend any certificate given under this section.

SEC. 8. That the powers conferred by this act of granting a license or giving a certificate for the performance of an experiment on living animals may be exercised by an order in writing, under the hand of any judge of a court of record having criminal jurisdiction in the District, in a case where such judge is satisfied that it is essential for the purpose of justice in a criminal case to make such experiment.

Senator GALLINGER. On the 26th of May, 1896, a report was made to the Senate of a hearing that was had on the 17th day of April, 1896, upon a bill identical with the one now under consideration. Some complaint has been made and some misapprehensions, apparently, have existed in reference to that hearing. Personally, I do not care to go into the matter, but as I understand that an impression has gone abroad that a proper hearing was not given to the opponents of the bill, it is proper that I should make a word of explanation. Possibly that hearing was somewhat hurried, and perhaps not sufficient time was given to either side, but, nevertheless, the purpose was to be fair and impartial; and, inasmuch as it has been stated that the hearing was one-sided, I desire to read, from the printed record of that hearing, some preliminary observations that were made regarding the disposition of time, etc. I chanced to preside on that occasion, being chairman of the subcommittee in charge of the bill, although the bill then under consideration had not been introduced by me. Neither was this bill that is now under consideration, and known as the Gallinger bill, introduced in the Senate originally by me.

The stenographer's minutes of the proceedings of the hearing of April 17, 1896, show that the following colloquy took place:

Senator GALLINGER. As time is very valuable to most of us, we trust you will be as concise as possible. At the same time, it is the desire of the subcommittee to treat both sides with the utmost fairness and courtesy and to allow as much time as is required to present properly both sides of this question. I will take the liberty to inquire of the parties representing each side of this question what their wishes are in regard to the length of time to be allowed, and we will endeavor to make an arrangement as to the division of the time that will be satisfactory to each.

Mr. R. ROSS PERRY. What total time would the committee feel disposed to give? Then we can divide it.

Senator GALLINGER. The question has been submitted to the chairman of the subcommittee as to whether it would not be the proper thing for the advocates of the bill to have the opening argument, and then a brief time for rejoinder. I think that is a reasonable request, and is the usual course in hearings of this nature. How many are to be heard on each side?

Mr. PERRY. We desire three men to be heard on our side—two in opening and one in closing.

Senator GALLINGER. How much time do you desire for yourself and the other two?

Mr. PERRY. To properly present this subject would require a good deal of time, probably more than you can give. In that case we will be able to give only a skeleton argument.

Senator GALLINGER. Do you desire, Mr. Perry, to make the closing argument?

Mr. PERRY. I propose to open, Mr. Kennedy will follow, and Dr. Leffingwell will close.

Senator GALLINGER. Dr. Sternberg, I believe you represent the opponents of the bill. What are your wishes?

Dr. STERNBERG. Mr. Chairman, we did not know of this hearing until to-day, and were compelled to come here without any previous preparation. We will be governed entirely by the time that will be given. I should say that whatever time is granted to the other side will be acceptable to us, and that we will select three from our side to speak if that is the number that will present the other side. I feel very sure that we will find it difficult to conclude the hearing to-day if so many gentlemen are to speak. I know there is a delicacy on the part of the chairman to limit the time that the parties interested in a great question like this may desire to occupy.

Senator GALLINGER. Then, Mr. Perry, would an hour be satisfactory to yourself and the gentleman who is to follow you, giving additional time to Dr. Leffingwell to close?

Mr. PERRY. I think so.

Senator GALLINGER. Dr. Sternberg, would an hour be satisfactory to your side?

Dr. STERNBERG. I think so.

Senator GALLINGER. We will then proceed with that arrangement. One hour will be given to the advocates of the bill, one hour to the opponents of the bill, and then Dr. Leffingwell in closing will be allowed—how much time do you desire, Doctor?

Dr. LEFFINGWELL. About twenty-five minutes.

Senator GALLINGER. Then twenty-five minutes will be allowed to Dr. Leffingwell to close. That arrangement will give the advocates of the bill a little more time, but somebody has to close and I think courtesy usually grants that to the advocates of a bill. Suppose we allow the opponents an hour and a quarter. Is there any objection to that, Mr. Perry? If we are not able to get through to-day, we will come to-morrow.

Mr. PERRY. That will be satisfactory.

Subsequently, the record shows the following observations to have been made:

Mr. PERRY. Mr. Chairman, I learn that Dr. Leffingwell must leave town this evening. May I ask if it will be possible to conclude this hearing this evening?

Senator GALLINGER. I will say that as an individual member of the subcommittee, I will stay until half past 6 o'clock if necessary.

Mr. PERRY Then I will take twenty minutes, Mr. Kennedy twenty minutes, and Dr. Leffingwell twenty minutes in closing.

Senator GALLINGER. I think that will be satisfactory.

With that understanding the hearing was entered upon, and the first suggestion that ever came to me that it was not considered a fair and impartial hearing came through a publication that was presented to the Senate and printed as a public document and sent over the country, stating that it was a one-sided affair. I greatly regretted that such an impression should have gone abroad, because that certainly was not the purpose of the chairman of the subcommittee.

It is proper that I should add that I have not been indifferent to the severe criticisms that have been passed upon me personally by the medical press of the country. It perhaps can be well epitomized in a single sentence contained in a letter that I received from my youngest son, who is a practitioner of medicine in the city of Concord, N. H., who writes: "Possibly you have not seen how you are being roasted in the medical journals of the country." [Laughter.] The matter is one of no importance, of course; I am not now practicing medicine; and I did not pretend to know everything when I did practice it; perhaps none of us know too much. Another suggestion that appeared in a medical journal that reached me a few days ago does not give me much concern. That journal suggested that my practice was not very regular when I did practice! [Laughter.] There are none of us, perhaps, that are perfect, whatever our schools may be, or our professions.

We enter upon this inquiry this morning free from prejudice, I trust, on both sides. We will consider the whole matter good naturedly, trying to be fair and impartial, and trying to have a full hearing. Perhaps I ought not to have said a word of a personal nature, but I have felt that it was proper I should do so.

Now, I will venture to make another suggestion that I think may ecomomize time, and yet you gentlemen will exercise the utmost latitude in your discussion of this bill.

The suggestion I would make is this: that as I read this bill—and as I have already said, I am not the author of it—the question is not so much one as to the abolition of vivisection or the usefulness of it as it is a question of the *regulation* of vivisection. I wish to repeat and emphasize that. It is not, as I understand the bill (and I have tried to read it carefully), a question of the abolition of vivisection or the usefulness of vivisection, but it is a question as to the regulation of vivisection.

In other words, I can say for myself that I should concede as a premise *that vivisection* should not be abolished; that vivisection has been useful

and is useful; but that vivisection may properly be regulated by Congressional enactment. Of course, as I have said, you gentlemen will exercise the utmost latitude in discussing the bill, and can take issue with that statement if you choose, so far as the bill is concerned; but that is the way I understand it; and I have come to that understanding from a very careful consideration of it and from repeated reading of the bill.

Now, gentlemen, as to time. I need hardly say that this is a busy time with men in public life, and it happens to be an especially busy time with me; I will not consume time in explaining why. It has occurred to me that we might first reach an agreement as to the mode of procedure; and then we could reach an agreement as to time. Dr. Keen has written to me once or twice (and Dr. Keen's views certainly are accepted with great consideration by everybody in this country) saying that we ought not to be cramped for time. I quite agree with that suggestion. It has occured to me that we might proceed now until 12 o'clock upon some amicable arrangement, then take a recess until 2 o'clock, and then return here and stay through the afternoon. I am willing to deny myself the privilege of attendance in the Senate Chamber, although there are some matters there that I ought to attend to. We will give the day to this hearing. I will ask the ladies and gentlemen on both sides whether that is agreeable to them? [No objection being made] I assume, then, that that is agreeable all around.

Now, I will ask you gentlemen to agree upon some mode of procedure. At the hearing nearly three years ago (and it did not seem possible that it was so long ago till I looked it up) we had no difficulty in reaching this agreement—that the time should be equally divided as nearly as possible; that the advocates of the bill should put in their case for the most part; that the opponents of the bill should then have their "inning," and that one gentleman representing the advocates of the bill should be heard in closing. There seemed to be no objection to that arrangement at the former hearing. If there is no objection to a somewhat similar arrangement now, I should be glad to have the fact stated.

Dr. KEEN. I should be very glad if the committee would divide the time equally between the two sides, and that the advocates and the opponents of the bill should present all their arguments—the opponents finishing. It hardly seems to me to be fair that the advocates of the measure should then have the opportunity of traversing our arguments or statements with no possible means left to us of counteracting any statements from their side.

Senator GALLINGER. I see the force of your suggestion, that under the arrangement suggested the proponents of the bill would absolutely have the closing, and your side would have no opportunity to make answer.

I want to say that I think ordinarily the opponents of the measure should first be heard; in fact, it is the opponents of the measure that have asked for this hearing—and that the advocates of the measure should be heard in reply; but we arranged it before so that the advocates would proceed first and the opponents of the measure be then heard and a brief rejoinder made.

I will make this suggestion: Suppose we first divide the time equally between the two sides; after that, the advocates of the bill be given half an hour, and then the opponents of the bill be given, say, twenty minutes?

Dr. KEEN. That will be entirely satisfactory to me. As I understand, the advocates of the bill will take the time first; then the opponents; and then a short reply in rejoinder on each side.

Senator GALLINGER. Yes; if that is satisfactory to both sides.

Mr. PERRY. We are the proponents of this bill, Mr. Chairman; we are offering it. Whatever burden there may be of inertia with respect to it, we have to overcome. The practice everywhere is that those that have such burden should have the opening and closing. Of course there should be no unfairness about it. I should prefer that two statements should be made in opening; and, before the closing, every argument and fact should be in, but I respectfully suggest that we should have the opening and closing.

Senator GALLINGER. Will two hours on each side do?

Dr. KEEN. I think that two hours will be entirely satisfactory.

Mr. PERRY. Then let each side divide it as they may feel disposed. I have another engagement this morning, and therefore should like to make the opening statement.

Senator GALLINGER. Permit me to get this matter of the procedure first fully agreed upon. I am bound to agree with Mr. Perry that the method he suggests is fair and proper, and yet in my great desire not to have any ill feeling or misunderstanding, I did make the suggestion that someone on the other side might be heard very briefly in rejoinder at the close. If the friends of the bill insist that the other method shall be proceeded with, and that they shall have the opportunity to close the debate, the chairman is inclined to hold that that is their privilege. If Mr. Perry insists upon that——

Mr. PERRY. We have all the burden, Mr. Chairman.

Senator GALLINGER. Of course, I appreciate that, Mr. Perry.

Senator KENNEY. You are bound to state your case at the beginning.

Mr. PERRY. Before we close. I am not going into the details of the case. This will be done by one of the medical gentlemen.

Senator KENNEY. But you will state the case in the opening, so that in the reply no new matter may be brought in?

Mr. PERRY. I understand that some of the doctors on our side will present some matters also, so that before they get through the committee will be possessed of the case.

Senator GALLINGER. Then the chairman rules that the time be equally divided—two nours to each side—that the advocates of the bill shall open the case. Who is to close?

Mr. PERRY. I suppose that Dr. Leffingwell will close.

Dr. LEFFINGWELL. I should like to have thirty-five minutes.

Senator GALLINGER. The chairman will then rule that the advocates shall occupy an hour and a half in opening; the opponents of the measure shall then have two hours, and Dr. Leffingwell shall take thirty minutes to close.

Dr. KELLY. Is it intended that the arguments of the opponents of the bill shall influence the committee?

Senator GALLINGER. That is the supposition. Perhaps it is a violent assumption that anything can influence the minds of statesmen that is not in the line of their work. [Laughter.] However, there are three members of the committee here, and we hope to have more here before the opponents reach their side of the question. With that understanding, Mr. Perry may proceed.

Mr. PERRY. I will take only a half hour.

Senator PRITCHARD. Before Mr. Perry begins I would like to say that it is necessary for me to leave at 11 o'clock on an important matter to which I have to give some attention elsewhere.

Senator GALLINGER. It is now half past 10. I will say that a full stenographic report of these proceedings will be made and it will be *printed.*

There is one other matter that I do wish to call attention to as a preliminary. The question of printing is a matter that has not been spoken of here to-day, and it may as well be considered, and yet I do not know that we can reach an agreement on that point. A good deal of matter was inserted in the last report; pretty much everything was inserted that was offered—everything that was offered, the clerk of the committee tells me, was printed. I observe, by an examination of the record, that 21½ pages of the printed report were given to the advocates of the bill, and about 100 pages to those who opposed it, so that certainly, so far as the printed matter was concerned, we were not prejudiced in favor of the measure. Mr. Perry may now proceed and we will decide the matter of printing as we go along, if the gentlemen ask to have papers printed.

STATEMENT OF MR. R. ROSS PERRY, OF WASHINGTON, D. C.

Mr. PERRY. Mr. Chairman and gentlemen, my sympathies are naturally aroused in behalf of the chairman of the committee by the statement that he is being "roasted." [Laughter.] He is in good company. Many men who have been engaged in the best works have been roasted in this world, and if roasting is to come to him at all I am glad it is here. [Laughter.]

This question naturally presents itself to me as a lawyer. A number of us are now engaged in going over a code of laws for the District of Columbia. Yesterday my attention was called to the present law preventing cruelty to animals. One section of that law contained a most unusual section. It is, in effect, that the provisions of law applicable generally to prevent the infliction of cruelty upon animals shall not apply to any man who is able to sustain the assertion that he is conducting cruel experiments for the advancement of science.

So that, effectively and practically, the domain of cruelty is open, without restriction and without control of law, to a man who can call himself a scientific man. The lawyer recognizes this as a solitary instance.

If the Emperor of Russia should prove a cruel tyrant, the right of revolution would restrict and control him. The President of these United States is not beyond control of the law, if he violates the injunction against cruelty. He can do wrong; he can be impeached and removed from office, and then punished for his misdeeds as though he were the humblest citizen of the land. There is no dignitary of the church, there is no man, high or low, beyond the reach of the law when he sins against it, except one, and that is the judge. It is essential for the proper administration of the law that the judge who administers it shall, with a serene mind, act untroubled as to any responsibility for that which he does as a judge.

True, he, too, can be impeached, but he can not be punished after impeachment for the acts he does as a judge. He is absolutely irresponsible to the law for what he does as a judge.

No other relation is so holy as to be exempt from responsibility to the law. The thing called cruelty, which the law ranks to-day as a crime, is guarded by provisions of law. The man who is guilty of cruelty must answer for it. The woman who is guilty of cruelty must answer for it. The child must answer for it. Only one person must not answer for it, and that is the man who says that he is cruel in order that science may be advanced.

Is not that monstrous? You would suppose that if legislators were considering the probability of a crime being committed when legislating with respect to it they would say, "Why, here is a certain class of persons who are above temptation; here is a class of persons who are so protected by the very relationship that they occupy toward certain others that it is improbable that they will commit cruelty. We will not have a law to insult mothers by even assuming it to be possible that they will be cruel to their own children."

Not so. The law is not made for the many who will observe it, but for the few who will violate it.

Take the highest and holiest of relationships—that of a mother to the little life that began beating under her heart, growing from her blood, pulsating with her life, having no distinct life from hers until it comes forth into the world. You would suppose that a relationship of that sort would be acknowledged by the law as so sanctioned by all the great fundamental emotions of our nature that it would not be necessary to insult a mother by saying, "You shall not be cruel to your child." But is that the law? Can any mother here in this District to-day be cruel to her child without answering for it to the law?

Why, to the lawyer the thing is monstrous—to have it said that here at the end of this nineteenth century, and as we are approaching the beginning of the new century, we are to go into that new century with an acknowledgment that in the capital of the nation, and in this land, where it is the boast of every one of its founders and of their worthy successors that it is a land of law and that all are subject to the law; is it here that we are to say on our statute books that cruelty can be committed by a certain class of people and under the protection of the law.

Cruelty is a thing which the enlightened and educated conscience of the foremost people of the world to-day recognizes as a crime, and yet we are going to say that that crime may be committed by a certain class of persons; that when they say they are doing the cruel act in order to advance science, the law is to say, "then I have no objection whatever to offer; you can go on; I can not control you; I can not even inspect you; you can go on as a class, where no other class is, outside of the law."

Why, what was it before this terrible civil struggle that gave us a bond of blood that put a new white garment upon our civilization? What was the thing that the people of this country urged as a condemnation of slavery? Not so much slavery in itself as the fact that so long as there were slaves there was a body of human creatures outside of the law.

Now I say, in the first place, that it is an anomaly. I can not understand it except on the theory that this section of the law was inserted without notice, without opposition, without consideration. I can not understand how that section found its way upon the statute books of this District—declaring that the law shall not apply to a certain class of men—that they shall not be under its supervision or control.

Let me make one other and general remark. The advocates of the proposed bill are taunted by the medical profession with ignorance. It is objected to them that they are emotional—that the objections which are urged against the practice of vivisection are emotional objections. I grant that they are, but I have yet to learn that the emotions of the common people who are not scientifically educated—that the emotions that lead them to rebel against a certain thing—are objectionable emotions. The American Revolution was an emotional one.

"Millions for defense, but not one cent for tribute." "Give me liberty or give me death." All this was emotional. Love is an emotion. I can not understand what the objection means.

If it were proposed, as vivisectionists have proposed, to take an idiot or a criminal and dissect him alive, the objections to that would be emotional. Why is it to be said that any doctor in this city can do with impunity what an Italian doctor in Brazil boasted of having done—a man who had so blunted his nature (as we all know men may do by outrages upon humanity) that he did not know that the emotions would be excited when he published, as he did two years ago, that he had been injecting, for experimental purposes, what he called yellow-fever serum into pauper patients suffering from other diseases?

More will be said upon that aspect of the case. It can not be doubted that it has been seriously proposed by vivisectionists that the bodies of living criminals should to-day, as was done some hundreds of years ago, be delivered up for the purposes of vivisection. It can not be doubted that that was advocated; it can not be doubted that it was openly confessed by physicians, biologists, physiologists, and others, that they have experimented with living subjects—generally with pauper subjects. I say that can not be doubted. When you go from the human race into the domain of the animal kingdom and consider the atrocities that you find admitted in medical text-books (experiments most crucial, most agonizing—that are inflicted on animals without anæsthetics—some doctors, like Brown-Séquard, even boasting that they have not regarded animal pain as worthy of consideration, just as the doctor in Brazil probably had not thought it worthy of consideration whether the emotions of men would be excited when it was told that he had been abusing, without their consent, patients suffering from other diseases by injecting into their veins his yellow-fever serum)—I say that when a people reaches a condition in which the emotions will not be excited when such facts are known, facts violative of the universal instincts of the human race, then indeed that people are decadent.

We are fortunate in having this matter in such a situation that anyone who cares to read all that can be said upon the subject has only to turn to the printed report of the hearing which was had before this committee of the Senate three years ago.

In the limited time at our disposal to-day nothing can be done except to advert to certain very general features.

I have no doubt that when gentlemen upon the other side of the case speak we shall hear a great deal with regard to the results of this fiendish practice. I am only a layman, but I do want to say a word upon a point that has impressed me greatly, and that each day impresses me more. I have known a great many doctors. Like the woman in the Scriptures, I have suffered many things at their hands. I do not blame them for it; it is the inheritance of humanity. As a layman who has some little sense and education, and who has talked a great deal with doctors, and heard their claims with respect to what has been accomplished, this fact does impress me—that, taking practical results, outside of the domain of surgery (where the eye can see and the hand can act under the guidance of the eye), and leaving out of view also what hygiene has done for us, and taking the domain of medicine itself, physicians are as absolutely powerless as they were at any age of the world. If I thought that there was any power in them I should demand of them many of the prematurely dead who should have been saved from death, but whom they failed to save.

Is there a man who stands at the bedside of his dying parent, wife, or

child who does not feel that these doctors are powerless as he is powerless? But let me before I pass from that say one word. If they could do anything, you would suppose it would be with diphtheria and scarlet fever. They will be here with their claims regarding that, and yet there were probably never in the history of Washington so much diphtheria and so much scarlet fever as this winter. Until the last few years we have had no smallpox for a long time, and yet here it is again coming up despite them.

But that is not what I chiefly wanted to say. They have taken the animals nearest to man—the animals whose nervous system approaches nearest to his—and they have conducted their horrible experiments upon this nervous system. I have seen in the medical museum on Tenth street what they call, I think, a phantom brain—a brain with a lot of nerve centers and filaments of nerves running between them—and I was told by a doctor, in a rough way, how many animals had to be vivisected in order to get at the information that enabled that phantom brain to be constructed. And as I looked at it I felt as a man would feel to-day going through some dungeon of the inquisition in Europe, and looking at the instruments of torture that he sees there. What incredible, what intolerable agony that thing represents.

I should like to know if their achievements in brain anatomy and physiology amount to anything in a preventive or a healing way? Why is it that over here on the hill, at the asylum for the insane, there are, I do not know how many, but from 1,500 to 2,000 persons to-day afflicted with these diseases of the brain; and I can not help asking why it is that these asylums and hospitals for nervous and mental diseases are multiplying all over the country? Why is it that we have such great increase in mental and nervous diseases? If these gentlemen can do anything in a preventive or a curative way in these matters, why do they not do so?

I know that it will be said they can locate a tumor upon the brain, and can open the skull and cut it out. But that is not what I am talking about. If this brain physiology has enabled them to learn anything that will protect us from these brain diseases, why does not the world know it, and why is it that they are so impotent with respect to these brain diseases that are increasing so alarmingly? It is because while they may learn something with respect to physiology, while they may learn how the brain acts, yet the diseases of the brain, as of the other parts of the system, which through some wonderful secret or some necessity of nature, we are subject to, will be always with us, as the poor will be always with us, and the sick, the dying and the dead will be always with us. It is part of the necessity of our lives. These men are as impotent as are the people of China when they sit down and howl, hoping to scare away the crazy demon.

One other point I wish to mention is this: I have been reading during the past few weeks a discussion—it can hardly be called a discussion—some correspondence going on, called forth by the death of John Ruskin. The letters were mostly commonplace, but in the last batch there was a letter that struck my attention. The writer of it said this:

> You scientific gentlemen have professed to discover a very close bond of union connecting all animated nature. You have taken this thing of life from its lowest cell, or perhaps before it reaches a cell, and you have traced it up until it has reached its last form in man. How is it that those years of investigation could have gone on without teaching you some high feeling of sympathy with sentient, struggling, suffering nature? As you get higher, you find in this nature ability to be faithful and to love. How is it that you gentlemen can have followed that sacred thing, that development of life in all of its manifestations, through these grades, and not *have* had one of them touch your heart?

I come now to your emotions.

This man, this Englishman of to-day, stood aghast as he asked this question: "How is it," he says, "that you can do this and not have your hearts struck by it; how is it that you can hear a bird's song, which so touched Shelley that he immortalized it; how is it that you can have dogs to love you, dogs which would seem to have been created in order that faithfulness, despite all abuse, might be illustrated and taught to mankind? How is it that you can have had a horse serve you patiently, only wanting to know what you desire in order to do it; how is it that you can look into the eyes of such a horse and see there the same life that is in your child; how is it that you can see the look of a dog or a horse, that look having a loving and suffering soul behind it, struggling for expression, wanting to talk to you, and then take that dog and bind him down, and without pity cut his nerves, and crush his bones, and tear his flesh?

I will tell you how you can do it. You can do it because, when you have done these other things, you have brought into your life the revolt against its own law—that avenges itself. I know in my profession men who have so continually denied the principles of justice that they no longer know what justice is. We go back to the expression of that final truth in the Old Testament, when Jehovah is represented as saying to the Jewish people that because they would not observe His good laws He gave them bad laws as good laws. Men know what that means. It means: "I gave you nature, and you abused and forsook nature." Sir Walter Raleigh clearly expressed this grand truth when he said: "Take heed that thou add no artificial heat to thy blood with wine or spice till old age hath decayed thy natural heat," for, he says (and there never was a truer sentence written), "the sooner thou beginnest to aid nature, the sooner she will forsake thee and leave thee to trust altogether to art."

You know how a man destroys the faculty of natural sleep when he has to rely on drugs for sleep. When a man defies the emotions of his own nature he will go on until he can do as that Italian doctor in Brazil did, or as a doctor out in Ohio did when he proposed a law for the purpose. You will come to cutting up criminals alive, idiots alive, and paupers alive, and then some "interesting case"—man, woman, or child—alive. I say that professional truth, that intellectual truth, that scientific truth, that emotional truth, all point to this result. You are able to do these things; as you progress with them you take from preference those other organizations which approach nearer and nearer to your own. And the habit will go on, increasing with indulgence, until finally every natural obstacle which the ordinary man relies upon for protection will be overthrown. You will murder a man, a woman, or a child for a demonstration or a discovery.

Senator GALLINGER. The chairman will take occasion to suggest that if any member of the committee desires to ask a question of any gentleman on either side he will be at liberty to do so, and it will not come out of the time that has been allotted. The chairman may have occasion, for the purpose of enlightenment, of asking some questions, and I want it understood in the beginning that that is the usual custom, and, of course, there will be no objection to it. Who will next address the committee?

Dr. LEFFINGWELL. Dr. Matthew Woods, of Philadelphia, is here.

Senator GALLINGER. How much time, Dr. Woods, do you desire? There is one hour yet to be consumed on the side of the advocates of the measure.

Dr. WOODS. I think that about twenty minutes will be sufficient for me, Mr. Chairman.

Senator GALLINGER. Shall I call your attention to the fact that twenty minutes have expired, when the time comes?

Dr. WOODS. If you please. It will not take me more than twenty minutes.

Senator GALLINGER. Let me inquire of you before you begin, whether you are a practitioner of medicine?

Dr. WOODS. I am, sir.

Senator GALLINGER. Have you at any time been a teacher of medicine or of surgery?

Dr. WOODS. No, sir.

Senator GALLINGER. Are you a general practitioner or a specialist?

Dr. WOODS. I am a general practitioner.

Senator GALLINGER. That is all I desire to ask. You may now proceed if you will.

STATEMENT OF DR. MATTHEW WOODS, OF PHILADELPHIA.

MR. CHAIRMAN AND GENTLEMEN OF THE COMMITTEE: I speak as a physician with twenty-five years of experience in the active practice of legitimate medicine, realizing the seriousness and responsibilities of the medical calling, and holding that the physician who omits to familiarize himself with the results and methods of medical scientific research is guilty of neglect.

I believe in experimentation and research, but not at the expense of cruelty to the lower animals.

I hold that a man to comprehend medicine in its broad, philosophic entirety must either be an enlightened layman or a physician, knowing every branch of medicine, and not a mere specialist, who sometimes, because of the very limitations of his specialty, is inadequately acquainted with but one.

The mere medical specialist, even if his specialty includes vivisection, should no more be considered a physician than the mere fashioner of boxes a cabinetmaker, or the man who merely builds stairs or lays floors an architect.

I mention this in connection with the discussion of vivisection in particular, because I want to emphasize the fact that the medical specialist in vivisection, perhaps more than other specialists, is apt to presumptiously exalt his office, and throw a halo around his particular addiction beyond its importance to everybody but himself; being alone among specialists in claiming for his particular hobby exemption from the wholesome influences of restraining law. And yet, is he so much a creature of Divine guidance that he alone should be allowed to act according to the dictates of an unbridled will? Are his efforts so beneficent in their results, so merciful in their prosecution, that he alone can be referred to as the mahatma of a sanctified cult, into whose holy mysteries law is forbidden to look?

Can he alone raise his system of unhallowed rites into a religion, and, like another Roberts, claim for it prohibition from the beneficent regulations of legislative enactment?

Surely such a claim is contrary to the Constitution and arrogant in the extreme, and, if allowed, is there not danger, to quote from Portia, "that it will be recorded as a precedent, and many an error by the same example find its way into court?"

Ought law to be an instrument of discriminating favoritism? And if so, ought it to discriminate in favor of a system that practices burning and boiling, inoculating, mangling, scalding, flaying, starving, cauterizing, freezing, and cutting up helpless creatures alive?

A system bristling with atrocities and folly, a system in mortal terror of having even humane inspection look into its unseemly horrors, and that moves heaven and earth, as it has been doing for the past few months, to prevent the enactment of a law that would make its practices publicly known. If vivisectors are right, why do they object to investigation? If there is no cruelty, I am sure vivisection societies and humane organizations would be very glad to suspend. We do not want to stop investigation; only to prevent cruelty.

Does botany, astronomy, geology, or any other science, issue a specious protest against outside investigation? Why is it that vivisection alone is the weeping widow of the sciences, whining out a protestation of virtue, instead of in open candor leading a life above suspicion and unawed by scrutiny?

It is her guilt before Heaven, for it is "conscience" that makes cowards of us all. It is being constantly asserted by our opponents that to prevent vivisection would be to prevent the progress of science; as if all science was included under the head of "physiology." It would not stop the progress of physiology, for even this small department of science has made her greatest strides unaided by painful experimental research.

It has been announced in almost every medical society in the land that the bill we are at present discussing is a bill for the abolition of vivisection, and, in consequence of this false assertion, with no one interested or knowing enough to deny its truth, the few people friendly to vivisection in each society have succeeded in passing resolutions of unanimous protest, which, I suppose, were sent here; but when it is known how these were obtained, surely they will not succeed in influencing a vote, for this is not a bill for the abolition of vivisection, but rather its regulation—a moderate bill, legalizing vivisection and putting it under the protection of law, and, as the late Dr. Hammond, formerly Surgeon-General of the United States Army, and for some years an experimentor himself says, "It is an admirable bill. It protects both animals and the human race, and that is all that any reasonable person can ask."

Why, then, should you hesitate to vote in its favor? It embarrasses no one but the guilty, and can not retard advance in any branch of science.

Our opponents say vivisection makes for progress, yet Lawson Tait—one of the most successful surgeons, the most daring operator, the most philosophic practitioner the world has produced—says "vivisection has proved useless and misleading, and in the interest of true science its employment should be stopped, so that the energy and skill of scientific investigation should be directed into better and safer channels."

Its practitioners claim that vivisection makes for progress!

But look at the list of its fantastic follies—serum therapy, the juices of putrifying creatures injected into the tissues of women and men, causing, rather than progress, retrogression of an overcredulous profession into the medical mire of the middle ages, when—

> Eye of newt and toe of frog,
> Wing of bat and tongue of dog,
> Adder's fork and blind worm's sting,
> Lizzard's leg and owlet's wing

were compounded into sovereign remedies for disease, and marked the limit of ancient therapeutics. What is serum therapy founded on vivisection but a return to the disgusting pharmacy of the dark ages?

They say it makes for medical progress, and yet Brown-Sequard, a notorious vivisector, within the circumscribed limit of a specialty, claimed that his Elixir of Life, a vile mediæval mixture, based upon disgusting animal experimentation, was a panacea for all the ills of decrepitude.

They say it makes for progress, and yet Professor Koch, a specialist and notorious vivisector, saw in tuberculine (the serum of diseased cats and Guinea pigs), a remedy for that scourge of humanity, consumption; and not until victims of the remedy fell by hundreds, did his deluded disciples—and John Tyndal was among them—abandon it as a delusion to be let alone.

They say it makes for progress, and yet Pasteur, a specialist and notorious vivisector, saw in the serum of animals he first made mad an infallible remedy for a disease the profession is now beginning to feel never existed. At least, in ten years, a genuine case of hydrophobia has been sought for in vain. Pasteur caused a good imitation of the malady he imagined, but never cured said Dr. Peters: for paralytic rabies, the disease Pasteur produced, is only somewhat like the one described in the books, but never found in practice. And yet until his death Pasteur practiced upon the hysterical and credulous the cruel procedure that all disinterested investigators condemn, and still, his mercenary disciples in almost every civilized land, thanks to vivisection and the advocates of vivisection, reap large revenue from the new industry, curing people of diseases they never had, except in imitation brought about by the effect of dread upon expectant fancy.

While talking of the traffic known as pasteurism—an atrociously cruel traffic, cruel to both animals and man, and founded upon vivisection—we may mention, in passing, that the whole system of serum therapy, also founded upon vivisection, would fall into innocuous desuetude were it not for the fact that thousands of dollars' worth of antitoxin can be obtained from one old horse worth about $10.

If these illustrations were not enough to convince you that Senator Gallinger's bill ought to become a law, we might go on indefinitely, for the whole history would seem, from the printed record of painful experimental research, a series of such catastrophies, often as cruel and as fatal to men as to dogs.

All experimenters are not cruel, all experiments are not cruel; but to show what could become possible, even here, unless there is such a law as the one under discussion, I shall quote from the printed record a few experiments by men sometimes eminent, often upright, and otherwise commendable, in order to convince you that Senator Gallinger's bill may be needed, even in enlightened Washington, to protect men against themselves, as well as to protect animals from further cruelty.

Dr. B. A. Watson, of Jersey City, in 1890, wrote a book describing his experiments upon 141 dogs that he raised to a height of 24 feet, and then had them dropped upon bars and ridges of iron to study the effects of contusion and fracture.

In order to increase their injuries and prevent any resistance they might naturally make, he had their legs, as he said, hoppled. Of course their backs were broken, and sometimes other injuries were the result. All died or were killed after protracted suffering. He has since, after a lingering illness, died of cancer, and I have often imagined the agony of remorse that must have possessed him when in the throes of his

frightful malady he thought of the poor brutes that suffered so long and frightfully because of his ingenious cruelty.

"A clinical and experimental study of massage" by Dr. A. Castex (1892) contains the following:

First experiment.—Large watchdog. Extended on the vivisecting table on its stomach, the four limbs and head fastened, but not too tightly. * * * With a large empty stone bottle I strike a dozen violent blows on the thighs. The animal, by its cries more and more violent, indicates that the bruise is great and vividly felt.

Second experiment.—Large hound. The animal is fixed like the former. Placing myself at a certain height that my mallet may strike with greater force on the part to be experimented upon, I give, with all the strength of the right arm, twelve successive blows, with a great wooden mallet. * * * As in the first case, this dog indicates by his cries that the bruises are very painfully felt, after which he falls into a sort of sleep, broken by moans, for ten minutes. After this again he awakes agitated, and seems to suffer more than the first dog.

Sixth experiment.—A large watchdog. I try, at first ineffectively, to dislocate the shoulder. I only succeeded in dislocating the elbow and fracturing the right carpus by torsion [twisting].

I shall not quote others, as this is enough, I think, to convince you that as long as such atrocities can be done with impunity the enactment of such a bill as Senator Gallinger's is in order.

We are still kept busy refuting the false claim that the progress of medicine is due to experiments upon the lower animals, and yet every physician knows that most of the atrocities we condemn are, in the domain of physiology and therapeutics, the branches of medicine that have made least progress, while the department of surgery opens up possibilities of safe surgical procedure, not because of animal experimentation, which is comparatively slight in this direction, but because of surgeons realizing what John Wesley asserted over a half century ago—namely, that cleanliness was next to godliness. In connection with surgery it is, perhaps, better.

There is one department of surgery, however, more closely connected with experiments upon the lower animals than any other division—that is to say, brain surgery. Now, brain surgery, in consequence of this close alliance with animal experimentation, is the very division of surgery that promised most and realized least, except in the way of catastrophe.

Because certain animals (monkeys) lived with portions of their brains ablated—burnt out, blown out—it was concluded that men might have portions of their brain removed for the relief of certain disorders, epilepsy among them. After the sacrifice of hundreds of human lives because of the supposition that what had been done with impunity to animals might be done with safety to man, where is the surgeon to-day rash enough to attempt the cure of mental disorders (except in cases of concussion and the like) by cutting away portions of the brain? The lower animals lived after the removal of certain portions of the brain; men, when similarly treated, died.

This is but one of the many ways in which conclusions based upon animal experimentation resulted in the destruction rather than the saving of human life. So that with infrequent exception Macbeth's ghastly jest may still be relied upon as a conservative guide to brain surgeons:

> The times have been that when the brains were out
> The man would die—

even if monkeys, guinea pigs, and pigeons under similar circumstances survived.

We frequently hear, too, of the advancement in mental physiology, or rather the localization of brain centers, as a result of experimentation, and many even of our medical friends have the impression that the various mental faculties have been arranged and localized by experimental physiologists like pebbles in conglomerate.

If such a thing were possible (the localization of brain centers), Messrs. Horsley, Ferrier, and their continental confrères would have accomplished it. They have been at it long enough. They have tortured monkeys enough, although they imply that monkeys—deluded creatures—rather enjoy having their brains blown out for the benefit of science. They are well equipped mentally, with subtle intellects; skillful in the art of devising ways and means; cool, calculating men, who could "peek and botanize upon their mothers' graves;" capable, without a quiver, of thrusting a hot iron through the cerebrum of a terrified creature strapped to a board, and quietly, with scientific joy, watching and tabulating its subsequent actions. And yet it is still impossible for any man living to correctly localize a tumor or abscess of the brain outside of the motor centers. So that in consequence of all this suffering men have been retarded rather than helped in the solution of surgical brain problems; and thus it must be, for a good God could never have intended that knowledge beneficial to man should be obtained through the torture of innocent creatures.

Senator GALLINGER. There are forty minutes yet remaining. Who will next occupy the time of the committee?

Dr. LEFFINGWELL. I suggest that Dr. Cochran may now address the committee. He was for many years president of the Polytechnic Institute, of Brooklyn, N. Y.

Mr. GALLINGER. Let me inquire, Dr. Cochran, are you a medical man?

Dr. COCHRAN. No, sir, I am not; but I was a lecturer upon anatomy for many years.

Senator GALLINGER. About how much time will you occupy?

Dr. COCHRAN. I have no formal speech. I have come here rather to testify than anything else.

Senator GALLINGER. Let me ask the friends of the bill who else is to be heard? Are you going to be heard, Dr. Leffingwell?

Dr. LEFFINGWELL. I should like to be heard for a short time.

Senator GALLINGER. Because, if no one was to follow the next speaker he might have all the forty minutes to himself.

Mr. CRAMMOND KENNEDY. If all their time is not occupied by the other friends of the bill, may Dr. Leffingwell have the unused portion?

Senator GALLINGER. I should rule, not. The friends of the bill will please occupy the hour and a half, or else surrender the time. Dr. Cochran may proceed now.

STATEMENT OF DR. DAVID H. COCHRAN, LL. D., LATE PRESIDENT OF POLYTECHNIC INSTITUTE OF BROOKLYN, N. Y.

Dr. COCHRAN. Mr. Chairman and gentlemen of the committee, I shall endeavor not to weary you in the few informal remarks I wish to make.

I do not wish to be placed in a false position. I am not absolutely opposed to vivisection. I believe it has accomplished good and may be justified, for, as it is universally admitted, happiness is the end of creation, and conduct which is promotive of happiness is conduct in

accordance with the law of righteousness proclaimed in reason just as distinctly as if proclaimed by the audible voice of God.

The endowment of sensibility is the endowment of rights. Without sensibility there is no right. A being without sensibility can suffer no wrong. The foundation of your right and my right is the same; it is Sensibility. Endow any being with sensibility and from that moment he has rights, and they are to be estimated at their comparative value and respected. Upon these ethical principles it follows that if it can be shown that vivisection increases the total amount of happiness to all beings, it is not only justifiable but it becomes a sacred duty. But that is not the question. Whether it does or does not overbalance suffering and increase the total of happiness to all beings is not the question before us.

I have read over the bill carefully. It seems to me that it does not touch upon the utility of vivisection. It simply seeks to guard it from abuse. It seeks to place vivisection in the hands of the worthy, who will worthily use it for the worthiest ends. That being so, I am amazed at the opposition manifested against this bill. I can not understand the position of the opponents of the bill. These gentlemen, these very same gentlemen, have asked us to restrict the practice of surgery and medicine to those who are competent in their profession. There has been no claim that such legislation is a reflection upon the profession, or that it restricts the proper rights of professional men, or that it degrades the professions in any way. We have acceded to these requests, and we have placed restrictive laws upon the statute books of many of the States, and no physician or surgeon, no matter how high his testimonials of fitness and preparation, no matter how long his approved experience and great his skill, can enter these States from his own State and there practice medicine or surgery without subjecting himself to the severest penalties of the law, unless he first secures a license from the State authorities.

They, unlicensed, can not enter your State, Mr. Senator [indicating Senator Proctor], and professionally answer a call without subjecting themselves to very severe penalties. Have these laws degraded the professions of medicine and surgery? Rather, have they elevated them? Now, for the life of me, I can not understand why these gentlemen do not accept this law as acting in the same way. It takes the practice of vivisection out of the hands of quacks and often incompetent teachers, who would use vivisection for the purpose of illustrating facts that have been demonstrated and to satisfy curiosity. Yet there has been such a misrepresentation of the purposes of this law that it is very generally opposed by the profession, who have been led to believe that its object is to prohibit vivisection. I think the opposition is almost wholly due to these misrepresentations.

In looking over the Senate Calendar yesterday I was struck with an entry on page No. 51. I think that that is the most remarkable document I have ever read. I found on reading it over a statement that a certain bill was unnecessary, not referring to this particular bill, but to another, and with some disingenuousness, I think, the impression was conveyed that the remark bore upon this very bill now before us. The statement is there made that vivisection does not exist in the public schools of the State of New York, that it is legislation proposed against an evil which has no existence, and therefore it would be a mere incumbrance upon our statute books. I was astonished. You

will remember that Mark Twain said that truth was the most rare and beautiful thing in the world, and that it ought to be used with a great deal of economy. [Laughter.] I think the gentlemen appreciated the remark when they wrote that page. There is as little truth in it as almost any page I ever read.

What are the facts? Within a very short time of the issuance of that document the little city of Yonkers was turned topsy-turvy, and you saw an account of it in the papers—it was widely published—by the fact that students had been thrown into conditions of hysteria by witnessing experiments upon cats, conducted by a lady teacher in the public schools of Yonkers. Yet it does not exist in the schools of the State of New York! The same thing occurred in the schools of Watertown, in Jefferson County, and an excitement of a similar kind was produced there. You all know that Cornell maintains its cat farm, and when I inquired of a student, "Why do you want the experimental laboratory in biology?" the reply was, "To verify physiological laws."

What does the verification of physiological laws mean? It means all that we wish to guard against by this bill. The whole trend of modern teaching is in favor of illustrative instruction. We have gone so far that there is a reaction at the present time, fortunately, against it. Laboratory work—that is, the inductive method—has taken precedence entirely of the deductive method. In our schools of training, normal schools, the principle has been laid down (as wild as anything that can be imagined): "Never tell the pupil anything he can learn himself by observation and experiment." "Verify all laws that your class is required to learn."

What would be the result of this carried into practice? Every generation would commence back at the beginning of human experience, and would struggle anew up to the acquisitions of the present time. Instead of congratulating ourselves on being the heirs of all the ages past, of the results of their efforts and sufferings, instead of being the inheritors of all their wisdom, we would be compelled to traverse the weary path of human experience anew. It is a most absurd statement. Object teaching is a means and not an end. To verify well-known laws of physiology is needless repetition of cruelty.

Gentlemen, it is all wrong; it is false that vivisection has no existence in the public schools of the country. Every teacher who feels that he is up with the times feels that he must illustrate; and the worst sinners of all are, I must say, the ladies in the public schools. After attending the physiological laboratories, and hearing the lectures and seeing the demonstrations, they feel that there is something that is masculine, something that they wish to assimilate themselves to, in teaching, and they try to repeat experiments they have seen their masculine teachers perform.

Now, that statement that has been made in the Senate Calendar, page 51, must have been made either upon some foundation or upon none. If it was made upon foundation, there must have been inquiry, yet I assert that no inquiry has ever been addressed to me within the last thirty-five years, during which I have been president of the Polytechnic Institute of Brooklyn; and I know three other prominent schools, whose students number some 4,000, to which schools no inquiry has been addressed, and even if the inquiry had been made, I should hesitate very long before I attached importance to the answers that were given by the presidents of the colleges for these *reasons.*

When I was in charge of the State normal school I was directed by the State to visit the prominent schools of this country, and abroad, to learn their methods of instruction, discipline, and supervision, and I found in most of the colleges that supervision amounted to almost nothing. The professors in the different departments asserted their independence. They felt that any visitation of their room was impertinent intrusion. They conducted their work in their own way. They submitted to no dictation. I do not charge the presidents with any fault, but if you ask the presidents of any of our universities in regard to the specific methods pursued, I think you will find that they know nothing about them. Of you gentlemen who have been graduated from our colleges I ask how many times did you ever see the president of your college in your lecture rooms—how much supervision was exercised? I think you will answer, "Very little."

I dislike to refer to personal experience, but in my own school—in the Polytechnic—I made it a rule to visit the lecture rooms of professors at least once a week. The directions in regard to the methods to be pursued were laid out in the different departments. Notwithstanding all that, I found that I did not always know the work that was going on, and I could not. Within the last six years I went into a class room and found the students in a condition of hilarity. The professor had brought in a cat in a bag, and some practical joker had untied the string. The result was that the cat did not stay for the lecture on vivisection, and as it is rather difficult to persuade a cat to come back after being released from a bag, there had been no vivisection in that case. But I learned then that the vivisection had been practiced and the professor supposed that there was no harm in it, as he declared he was only repeating experiments that were made in medical colleges.

Some twenty-five or more years ago I visited a lecture room after the lecture was over, and I found a couple of pigeons sitting upon a gas fixture. A part of the brain from each had been ablated. Upon inquiry I found that the professor was verifying physiological laws. I was surprised. The thing was stopped. I think the gentleman, after looking the matter over, saw his error and repented; and since that time he has done works meet for repentance. This statement can be confirmed, if the gentleman sees fit to confirm it. That sinner was Dr. Leffingwell, who happens to be here at the present time. [Laughter.] At that time he was a vivisectionist.

I confess that I was a vivisectionist myself. When in Albany at the time of the Hendrickson trial some of you may remember that there was much discussion in regard to the poisons used. I confess that I experimented upon several cats to witness the post and ante mortem effects of the poisons; I learned that the effects were entirely unreliable, and I learned to be afraid to draw inferences from them in regard to the human subject. I found that some of the poisons acted by producing violent spasms, while, according to our books, they should have produced rigidity and paralysis.

I made up my mind that it was unsafe and abandoned it, and for forty-five years I have not performed an experiment of that kind.

Very recently we had a striking incident showing the unreliability of inferences drawn from animals to human beings. You may have been interested in the Molineux trial, which is just finished. It has attracted the attention of the whole world. You may remember that

one of the witnesses who appeared claimed that cyanide of mercury was harmless when administered in connection with bromo seltzer—that the carbonic acid decomposed the cyanogen and made it harmless. He offered to drink the mixture before the judge. The offer was declined. He claimed that he had administered it to quite a number of guinea pigs without any harm. He did drink the cyanogen, and the next day they labored over him for hours, and he barely escaped with his life, but the guinea pigs trotted around as lively as ever. This illustrates a well-known fact, and I think the doctor will accept the truth and not feel it necessary to repeat the experiment when he refers to his acquired knowledge.

There is a point that has not been alluded to by the gentlemen preceding me. As to our public schools (the lower class of schools), I believe it has been asserted that here in Washington there was no occasion for a law of this kind, because vivisection in the common schools did not exist. Perhaps it does not. Perhaps. But it may at any time break out. An enthusiastic teacher may feel that he or she ought to illustrate the physiological laws as physical laws are illustrated. I hope for the sake of the teachers themselves that restriction will be placed upon them in this matter; that it will be taken out of the hands of all such persons and confined to those who are capable of using it, and who will use it for worthy ends. No truly scientific man of character—no one who ought to vivisect—will ever have any trouble in procuring a license to vivisect under that bill. You are all aware of that. It will be no great inconvenience. It will simply guard vivisection from being used by those who are not fit to use it.

I ask you gentlemen most earnestly to restrict it from the public schools. Do not allow that class of teachers to inflict pain upon animals before children. Do not allow it for the sake of the children. Do not allow it for the sake of the teachers. Do not brutalize those teachers by rendering them insensible to cruelty. Do not permit its effects to be felt upon the children. The child, when he goes into the school for the first time, regards the teacher as the highest being on earth, next to his parents. The divinely implanted instincts of love and reverence tend directly to that result, and if the teacher loses that vantage ground it is his own fault. If he uses that influence for good how powerful it will be upon the child. If, on the other hand, the teacher is coarse and brutal, insensible to suffering, how benumbing and debasing it will be to all the finer qualities of the soul.

If I have ever aspired to do any good in my life I owe it, next to my mother and sister, to a female teacher, under whose influence I came at the age of 12 or 13 years. Gentlemen, it would seem like a sacrilege for me to recall in memory now that teacher with her hands and arms stained with the blood of the animals that I have always regarded as my pets and as my loyal friends. We do not ask for prohibition. We ask you to guard vivisection from abuse and restrict it to proper ends.

I thank the committee for its attention.

Senator GALLINGER. Twenty-one minutes have been occupied by Dr. Cochran. There are still nineteen minutes remaining. Who will occupy those nineteen minutes?

Mr. Crammond Kennedy arose.

Senator GALLINGER. You have nineteen minutes, Mr. Kennedy. Allow me to ask, before you begin, what is your profession?

Mr. KENNEDY. I am a lawyer, and one of the vice-presidents of the Humane Society, of this city.

Senator GALLINGER. Have you at any time studied medical subjects?

Mr. KENNEDY. No, sir; except as a lawyer has to do sometimes in certain cases.

Senator GALLINGER. That is all I wish to ask. You may now proceed.

STATEMENT OF MR. CRAMMOND KENNEDY, OF WASHINGTON, D. C.

It seems to me, Mr. Chairman, ladies, and gentlemen, that one of the most curious features of this interesting discussion is that it has been almost impossible for us to obtain from the other side anything like an accurate description or statement of the nature and requirements of this bill. All over the country it has been represented by the medical profession—not the whole profession, but those who have taken an active part in opposing this bill—that it is an antivivisection bill. And sometimes it has been described as a bill to abolish vivisection. Now, nobody can read this bill without seeing that its purpose is, first of all, to legalize vivisection, and I am sorry for it, personally, because I myself believe in the utter abolition of vivisection.

Under the general laws for the prevention and punishment of cruelty to animals a vivisector could be indicted and punished unless he could show to the satisfaction of the court that what he did was not cruel in the sense of the law—that the objects and tendency of his experiments were to alleviate human suffering or to open some new pathway in that direction. On the one hand, this bill gives the licensed vivisector protection of the law, and on the other it provides (and surely every scientific man should approve of this provision) that no one shall perform these delicate and painful operations without a license granted upon evidence in the form of a certificate from certain college professors or practitioners of medicine that he is properly qualified for such service.

What can be more reasonable than that? And why should doctors raise a presumption against their cloth that when their passions and prejudices are excited they can not possibly tell the truth—why should they do this by writing letters and signing their names to them, utterly misrepresenting the character of this bill all over the country?

As one of the gentlemen who preceded me suggested, it seems to me that the disposition that all scientific bodies and all learned professions show to exclude the incompetent from the practice of their various arts should help this bill. That is what Surgeon-General Hammond said. He made "no bones" about it. He recommended this bill. He said that it was a good bill; that it protected both animals and man, both the ordinary citizen and the scientific experimenter.

The bill provides that these experiments shall be performed by licensed experimenters, and that the experiments shall be reported. Is not that in the interest of science? Who wants a lot of bunglers to be bringing vivisection under a darker shadow than covers it now? Who wants the results of these skillful operations to be concealed from the public—this light of science to be hid under a bushel?

The bill will bring before the President of the United States and before every officer of the Government, and these officers will communicate to the people, who are growing in intelligence, the beneficent results of vivisection, if vivisection does produce these beneficent results.

Now, gentlemen on the other side, why do you not want your light to shine on us, and why do you not want the light of this bill to shine on you? Why should any set of men claim exemption from the scrutiny of the law? That is one of the most dangerous things ever broached—that any human being should have it in his power to deal with sentient creatures without responsibility to the law. I say, as a lawyer, that it is atrocious, and that the physicians—I beg the physicians' pardon, because physicians, as a rule, are not vivisectors, but the vivisectors who take that position show that there is something wrong with them—that they are conscious of some weakness—conscious, as was said by Sir Benjamin Ward Richardson, one of the greatest of biologists, that vivisection is something that is almost always practiced with compunction. And he had been a vivisector.

Why is it, Mr. Chairman, that as men grow older they become more and more imbued with the feeling that this life of ours, our existence, our consciousness—life in its broad, comprehensive sense, taking in man and beast—is a mystery, a unit, a spring of which we all alike drink, a spirit or force that keeps us all alive—that the sense of the mystery of life, and the oneness, the solidarity of all sentient creatures grows within us as we advance in years? One of the most touching and impressive things to me to be learned from the parliamentary report which, you will remember, Mr. Chairman, was used here so copiously at the last hearing, is that vivisectors, as they grow older and look back upon the failure of their hopes—men like Sir Charles Bell, Sir William Ferguson, Sir Benjamin Ward Richardson, who have tried by such experimentation to bless their fellow-men—confess (some of them) that its benefits are limited, and that those limitations are very narrow; and others that it has been a false light and has led them more than once into doing things that, instead of helping, have hindered and hurt humanity, while all regret the sacrifices and the agonies of this dreadful inquisition.

Now there is one thing, Mr. Chairman, that I wish to impress, if I can, upon us all before I sit down, and that is this—that there are things of far higher value in this mysterious and swiftly passing life of ours than mere happiness, or physical comfort or relief from pain—for even doctors have diseases, and doctors die, and we are all bound to the grave. "All that a man hath he will give for his skin." But what sort of a man is he that will do that?

I remember when the few that were left of my regiment held the fort at Knoxville that Sunday morning when Longstreet's gallant forlorn hope was thrown against our breastworks and piled in the deep red-clay ditch as they struggled to gain the parapet, literally at the cannon's mouth, I remember that while the artillery from the higher ground behind us was still shelling the woods into which the Confederates retreated when the assault had failed, and the ditch was full of the dead and the dying, I helped to take out a poor fellow whose thigh had been torn open by a shell—helped to take him from under five dead men. "Oh, God," he said, as we took him out, "Oh, God, but this is terrible!" Well, while the guns in our rear were still sweeping the open and the woods, some of those poor fellows lying outside cried for help, and there were two or three of the "Highlanders"—Scottish-Americans—who did not think of their skin, but went out under that storm of death and took their wounded enemies (brothers then) upon their backs and brought them safely into the fort. [Applause.]

Gentlemen, this appeal to fear—this everlasting appeal to the fears of women who love their children—this craven and sometimes mercenary appeal to society to sustain vivisection, on the ground that all

these cruelties inflicted upon animals are helping the human race, I say is demoralizing, and the sooner it is stopped the better. We do not want to obtain physical relief at the expense of the suffering of innocent creatures that Providence has put within our power [applause], and I say that when we do it we are paying too high a price for what we get in return. [Applause.] We lose infinitely more than we gain.

Why! What kind of a race would this be if we were always thinking of ourselves? Is it not the love of our fellow-creatures, the thought for others, that has taken us out of the pit and the mire, and that has given us hands instead of claws? Altruism is civilization. What means the Cross? You, gentlemen of the other side, without intending it, are turning the tide of civilization back, and making us mere selfish materialists, who will give all that we have for our skins.

This movement of ours is said to be "based upon emotion." But intellect is not incompatible with humanity. We have need of reason. But we also want emotion. We want the impulse that makes men forget themselves—that makes them able and willing and glad to endure suffering for others. And we do not want to have things recommended to us always, or too often, on the ground that they will make us more comfortable, especially if our comfort is secured at the expense of suffering deliberately inflicted upon any of God's sentient creatures. Is my time up, Mr. Chairman?

Senator GALLINGER. You have six minutes yet, Mr. Kennedy.

Mr. KENNEDY. One thing more, and that is this. All of these great vivisectors, even Sir Eric Erichsen, among them, who were testifying before a Parliamentary committee, emphasized what seemed to them to be a public and professional danger, that the tendency of the younger men was certainly to make needless experiments, that is, to prove to their own satisfaction things which are abundantly demonstrated, and, what was worse than that, these great scientists agreed that the penchant for vivisection was a thing that grew by what it fed on; and some of them went on to say that it sometimes developed a morbid disposition and affected the moral character of the experimenter. Those witnesses were not antivivisectionists, but distinguished experimenters themselves, some of whom testified that in their opinion the law ought to step in and regulate the practice.

Mark this: It is a law of nature that no man can familiarize himself with suffering without getting to contemn the object that suffers, unless he happens himself to be the sufferer. He will mock at disfiguration and pain. People do get so callous that until the thing touches themselves they do not care what happens. Consider what men have done to their fellows—"man's inhumanity to man"—from the dawn of history down. Take note of him who can go home and dine at his ease after he has poisoned a lot of God's innocent creatures, and can go to bed and sleep soundly while they are slowly dying in torment! There are men who can do things like that, and enjoy God's benediction of sleep! There are men like that, themselves the unconscious victims of so-called "science," all over the world, who are not fit to live, because they have lost that element of the human soul without which a man may become worse—I was about to say than the brute, but I beg the brute's pardon—worse than the cruelest and most selfish devil that imagination ever conceived.

Now, Mr. Chairman and gentlemen, Sir Benjamin Ward Richardson, in that book of his called "Experimental Biology"—which I wish every young doctor could read—goes on to say that what humanity needs most is soap and water. "Wash you, wash you," he says, "and make

you clean"—that is the last word of this great physician to his fellows. "Wash you and make you clean." All this dirty stuff, the "serums" and "antitoxins" on the market he has no use for. Sanitation is the gospel that he preaches. We are to keep ourselves clean, mind and body, and live according to the laws of health. We all die, sooner or later. Better die that way than with callous hearts seeking a few more days or a little less pain at the price of experiments which, if they can not be abolished, should at least be regulated and restricted as provided in the bill. [Applause.]

Senator GALLINGER. Dr. Leffingwell asked for thirty-five minutes, and it was decided that he should have thirty. There are two minutes left, and if there be no objection he may have thirty-two. There being no objection, that order will be made.

A recess will now be taken until 1.30 p. m., when the opponents of the bill will have two hours.

The subcommittee at 12 o'clock took a recess until 1.30 p. m.

AFTER RECESS.

Senator GALLINGER. The chairman has been furnished with a schedule containing the names of the gentlemen who will be heard in opposition to the bill now under consideration.

Dr. Keen will first occupy thirty minutes, and he will kindly act as master of ceremonies and present the other gentlemen.

STATEMENT OF DR. WILLIAM W. KEEN, PRESIDENT OF THE AMERICAN MEDICAL ASSOCIATION.

Senator GALLINGER. Let me inquire for the purposes of the record, Dr. Keen, before you begin, whether you are a practitioner of medicine?

Dr. KEEN. Yes, sir; I am a surgeon; professor of surgery in the Jefferson Medical College, of Philadelphia, and president of the American Medical Association.

Senator GALLINGER. You may proceed.

Dr. KEEN. Mr. Chairman and gentlemen of the committee, we are very happy indeed to accept the definition given by Dr. Cochran, that if the sum total of the suffering of all human beings is diminished by vivisection, not only is vivisection right, but it is our duty to perform it. We are stirred, also, as well as the ladies and gentlemen of the other side, by emotions—emotions of pity, emotions of sympathy, and emotions of love—not only for our fellow-men, but also for animals. We love them just as well, but we love them, as we think, more wisely than the ladies and gentlemen of the other side.

I do not propose to go over all of the various historical instances of the advantages of vivisection, for the question, after all, comes down to the simple fact, the fundamental fact, that if vivisection does diminish the amount of suffering on the whole, it is our right and it is our duty to perform it; if it does not, then we have no right to perform it.

I propose, therefore, in what I shall say, to take up from the view of a practical surgeon that which I personally know to be true. I am not a vivisectionist myself, but there is not a day that goes by that I do not use for the advantage of my fellow human beings the results of

vivisection. I propose to take up a very few—for time would fail me to deal with the matter fully—a very few of the points in which vivisection has been useful, and is useful every day, to me, as a surgeon.

Take the very first point that has been brought up by two gentlemen on the opposite side, namely, the question of brain surgery. It has been stated, with singular infelicity, by Dr. Woods that the presence of a brain tumor outside the motor area of the brain can not be diagnosticated, and that practically brain surgery is useless.

Thirty years ago it was absolutely impossible to say more than that a brain tumor existed. Where it existed and whether we could remove it was wholly unknown. I show you here [exhibiting a bottle with its contents] a tumor which I removed from the brain of a patient over twelve years ago, and that patient was in my office within one month. The tumor made no sign of its existence outside of the head. This patient's head looked like the head of any of us. This tumor was diagnosticated by reason, as Dr. Woods has admitted, of its motor symptoms largely. But I could have brought you also another large tumor which I removed from a patient only 40 miles from here, in Baltimore—a large tumor, not in the motor area, but in the frontal lobe, the exact position of which was diagnosticated without the slightest external evidence, by Dr. Osler, who is here to-day. It was removed and the patient recovered.

Dr. Woods evidently has forgotten all the tumors that have been diagnosticated in the cerebellum, at the back of the brain, and underneath the brain, and their existence proved, both by operations and (in some cases that were nonoperative) by autopsy. He has forgotten the tumors that have been discovered in the region of what is called the cuneus, in the back of the head, not a motor region at all, and from which they have been removed. He has forgotten also the large number of cases in which the location of tumors has been diagnosticated as not being within the operative area, and therefore not subject to the surgeon. The very argument that was advanced, I think, by Mr. Perry, that there are over 1,500 poor human beings suffering from insanity over there at the asylum because we physicians and surgeons are not yet familiar with the anatomy and the surgery and the physiology of the brain sufficiently to relieve them is, in my judgment, the very strongest argument in favor of that mode of procedure which almost alone, or quite alone, has given us our present knowledge of cerebral diseases.

If the lower animals had insanity we should know a great deal more about it than we now do. It is because of the researches of the physiologists and the psychologists that to-day we know enough of the anatomy and physiology of the brain to locate these very tumors and to locate other diseases.

It is evident that Dr. Woods has forgotten the still larger number of cases of abscesses of the brain which have been diagnosticated and operated upon, and of which a very large proportion have recovered, whereas were it not for those researches practically every one would have died. It is for these reasons that I say, sir, that we love animals, and we love our human kind just as well as, but much more wisely than, those who are advocating this bill.

Let me take another illustration. Ponfick a number of years ago made a series of experiments to determine how much of the liver could be removed without producing death. These experiments at the time

would certainly not have been presumed to result in an improved surgical technique and surgical results, and yet I hand you here, sir, a paper with a picture of a tumor of the liver much larger than my fist which I removed over a year ago, and that patient recovered—because Ponfick had shown that so much of the liver, and more, could be removed from animals and the animals survive.

I would like to know whether any gentleman on this committee would be willing to have submitted himself, or anyone near and dear to him, to the surgeon's knife without just such investigations to show that a large part of the liver could be removed, and that it was compatible with life?

Again, three weeks ago to-morrow, I operated upon a lady in Philadelphia who had a large tumor of the kidney, reaching from the right side beyond the middle line of the body all the way across here—a tumor large enough to fill a man's ordinary high hat. I removed not only the tumor but the kidney. Why did I venture to do that operation? Because, thirty-one years ago, in 1869, Simon, of Heidelberg, operated on thirty dogs and showed that a dog could live with one kidney. As soon as he had discovered that fact he applied it to a woman patient then under his care, requiring the removal of the kidney, and she lived for twelve years afterwards. Yet our opponents say that no good has resulted from vivisection.

Would you gentlemen be willing to submit yourselves or others to such an extirpation of the kidney unless you knew, by experiments upon animals—and then, having a firm foundation, the application of it to man—that a person could live with the loss of one kidney? I do not think that any of us would be willing to do that.

Senator GALLINGER. Just one word at this point, doctor (it will not be taken from your time). We desire to be accurate in this investigation. Have you read the bill under consideration?

Dr. KEEN. I have.

Senator GALLINGER. Have you found anything in the bill that prevents the vivisection of animals for the purpose of acquiring knowledge that would make the removal of such tumors successful?

Dr. KEEN. I will come to that in a moment, Mr. Chairman.

Senator GALLINGER. Very well.

Dr. KEEN. And when I refer to my own work, Mr. Chairman, I do it only because my own work is that of which I happen to have absolute personal knowledge.

Senator GALLINGER. That is the best knowledge.

Dr. KEEN. As a result of Simon's experiments, it is literally true that thousands of human beings have been operated upon, not only for removal of the kidney; but other allied operations have been performed, the result of his experiments showing that such operations could be performed and be compatible with continued life. They would never have been attempted, had it not been for such a scientific demonstration by vivisection.

Again, last December a man came into the Jefferson Medical College Hospital, of Philadelphia, suffering with an aneurism of the aorta. Now, aneurism or dilatation of the aorta—all here are not so well up as the chairman in professional terminology, and I congratulate ourselves upon having such a chairman—aneurism is a dilatation of the aorta, the great blood-vessel from the heart, which in this case made a tumor about as large as a good-sized Florida orange,

a little way below the breast bone. I tied that aorta to cut off the blood supply and endeavored to cure the aneurism. Up to that time eleven operations had been performed on such aneurisms. Nine of them had died within forty-eight hours; one lived sixty hours; one (performed in 1842 in Rio Janeiro) had lived for eleven days. My patient lived for forty-eight days, and died because the ligature, as was determined by the post-mortem examination, had ulcerated through the vessel.

Now, what is my duty? If a man can live forty-eight days with his aorta tied, he can live forty-eight weeks. The processes of life, as was shown by this operation, can go on with the aorta tied. The trouble was that the string with which I tied it cut through the aorta, homorrhage followed, and the man died.

It is not only my duty, but it is my highest duty, in my conviction, to see whether on animals some other method of operating will not enable me to tie some other man's aorta and save life.

In fact, this whole question of ligatures, as we call the silk or other material with which we tie arteries, is one of the most important of all the questions connected with antiseptic surgery. The old way of doing an amputation, for example, of the thigh was to tie 20, or sometimes more, arteries with a piece of silk, letting one end hang out of the wound, cutting the other off short and then beginning, say about the third day, to pull each one of those strings to see if it had rotted off from the artery. In the meantime what became of the patient? Parched with thirst and fever, racked with pain, and exhausted by sleeplessness, his wound reeking with pus or "matter," that man sometimes got well, though the statistics of major amputations then showed about 50 per cent of deaths.

In such cases, what happens now? We take disinfected silk, catgut, or other material and tie the vessel, cut off both ends short, shut up the wound, and you never hear any more of the ligatures, nor do you have the repeated hemorrhages which then followed the rotting off of the ligatures and destroyed so many lives.

The whole question of antiseptic surgery, you will observe, depends, first, upon the absence of all germs. That has been proved partly by laboratory experiments, not experiments on animals. But, after all, when you had proved this in the laboratory you had to apply the knowledge. Where should you first apply it? Shall it be applied to a man or to a dog? It is a question of the man on one side, or the animal on the other. Yet when Lord Lister, whose name is the most illustrious in this century in the history of surgery, wanted to carry on some further experiments in Great Britain, where, as Dr. Leffingwell has expressed it, the "very moderate restriction" of the law applies—experiments for the direct benefit of humanity—he was obliged to go to France to carry on his experiments for the benefit of the human race, because he could not do it in England!

I alluded a moment ago to the mortality of amputations as about 50 per cent. It is now, sir, not over 10 per cent.

Senator GALLINGER. To what do you attribute that change, Dr. Keen?

Dr. KEEN. I attribute it chiefly, almost entirely, to the antiseptic method, which never could have been brought about, never could have been confirmed, without laboratory experiments, both with and without animals. A moment only, sir, and I shall be done.

A question has been asked by you in reference to this bill. Now, the administration of the bill is, practically, very largely the question at issue. We have no law of this kind in Pennsylvania. But even in the absence of that law, let me state one little incident which shows what would be the administration of a stringent bill, as I regard this, in this District.

There was sent to me at the Jefferson Medical College Hospital three or four years ago a man from Nova Scotia with paralysis of one leg below the knee, as the result of an accident which had destroyed the nerve just back of the knee. From the history of the case I judged that a considerable portion of the nerve was gone, and that therefore I could not bring the ends of the nerve in contact and sew them together to reestablish the continuity of the nerve. I sent to the pound to get a dog for the purpose of taking from him a piece of nerve and putting it into the gap between the two ends. The man whom I sent was refused the dog. Thinking there was not sufficient information on the part of the president of the Woman's Branch of the Society for the Prevention of Cruelty to Animals, who had charge of these dogs, and who killed them by fumes of carbonic acid, I wrote an official letter to her, as the professor of surgery, and asked for the dog, stating that the dog, first, would be chloroformed; second, would have precisely the same care as the man, because if I did not take the best care of him, then my whole efforts to relieve this man would be rendered futile, because the nerve would be infected and would infect the wound, and so would nullify the operation; and, third, when I got through the dog would be chloroformed to death and never wake up. I was refused the dog.

Now, Mr. Chairman, when it comes to such a pass that even without such a law as this, when I want to save a man from helplessness and the inability to earn his daily bread by taking a nerve from a dog I am refused a dog, I say that is cruelty to human beings. Were such a law as this in existence in Pennsylvania how much worse would it be.

Senator GALLINGER. We recognize you, Dr. Keen (I certainly do) as a man of profound learning in the medical profession and as speaking, in a sense, by authority. I should like at this point, if it is not offensive to you, to ask you a few questions.

Dr. KEEN. It will be perfectly welcome to me, sir.

Senator GALLINGER. Do you mean to say that you could not get a dog in the city of Philadelphia to perform an experiment upon?

Dr. KEEN. No, sir; I do not mean to say that; but I was refused a dog at the place where I knew I could get a dog, even though I wanted to help a human being. It shows the profound cruelty of our opponents.

Senator GALLINGER. But you knew you could get a dog?

Dr. KEEN. Yes; but that was the easiest place at which to get a dog.

Senator GALLINGER. Are you a practical vivisectionist?

Dr. KEEN. No, sir.

Senator GALLINGER. Now, doctor, are you fully satisfied that the art of medicine has been greatly advanced through the instrumentality of vivisection?

Dr. KEEN. I say unhesitatingly that to my personal knowledge as a surgeon vivisection has done more to advance surgery and medicine than any other one agency within my knowledge. My position is that *I am an expert, whose testimony* can scarcely be impeached.

Senator GALLINGER. You spoke, Dr. Keen, of certain surgical operations which you performed which were undoubtedly extraordinary and required great skill. And you stated that the knowledge which you obtained which led you to undertake those operations came from experiments performed on animals. Could not those experiments have been performed on animals with anæsthesia as well as without?

Dr. KEEN. Large numbers of them are performed with anæsthesia.

Senator GALLINGER. Then if you have read this bill you must have noticed that the only restriction is that the animals shall be anæsthetized.

Dr. KEEN. There would be no objection to that provision in most experiments.

Senator GALLINGER. It is in the bill.

Dr. KEEN. There would be no objection to that provision, with the single exception that I will mention, in which an anæsthesia would defeat the very end in view. Take, for example, this case: If we did not know to-day that the two roots of the spinal nerves had totally different functions, one for motion and the other for feeling, in that case we could not use anæsthesia to discover that fact, because anæsthesia abolishes feeling.

Senator GALLINGER. That is rather an unusual investigation, is it not?

Dr. KEEN. Yes.

Senator GALLINGER. One experiment would determine the fact, would it not; or two or three experiments?

Dr. KEEN. No, sir. I should hardly like to operate on you, sir, with the knowledge derived from two or three animals.

Senator GALLINGER. Let me ask you in that line: Do you think it necessary, after a fact has been demonstrated by vivisection, to have that operation or that investigation repeated over and over again by medical students or physicians? Is it not sufficient to determine the fact and then you, as a teacher, tell your students that that fact has been demonstrated absolutely?

Dr. KEEN. Precisely, in a great many instances; but notwithstanding that fact, the demonstration teaches far more than any statement can do. But I think it ought to be done just as seldom as possible.

Senator GALLINGER. You suggested a moment ago the wonderful advances made in surgery; that the large proportion of recoveries made at the present day as compared with the time when you and I were struggling with our books is due to vivisection, and that those methods that are now employed could not have been made useful had it not been for vivisection. I wish to ask you whether some of the most distinguished surgeons in the world have not taken direct issue with you on that point?

Dr. KEEN. No, sir.

Senator GALLINGER. What about Dr. Lawson Tait?

Dr. KEEN. I am perfectly aware of the position of Mr. Lawson Tait. But Mr. Tait, in the first place, was a man of very positive views; and if at any time he took a position with regard to anything he always stood by that position, no matter what the evidence was. More than that, Mr. Tait's statistics are disbelieved by the majority of English surgeons. They have cast doubt upon them throughout; and in addition to that, granting all that Mr. Tait's eminence in very many respects deserves, he stands practically alone. There are people, as

you well know, who will believe in almost anything in the world. There are people even of good sense who are spiritualists, Christian scientists, and polygamists, but we do not give their testimony the weight that we do to others. Of really eminent surgeons and physicians of Mr. Tait's way of thinking in this matter you can not get more than can be counted on the fingers of one hand, against the entire medical profession on the other side.

Senator GALLINGER. That may be so, although the inquiries sent out have not shown that to be so, taking the profession at large; but is it not a fact that Tait was one of the most noted ovariotomists of his time? I believe he is now dead.

Dr. KEEN. He is now dead. He was one of the most noted ovariotomists.

Senator GALLINGER. Were not his experiments among the most noted of those made by ovariotomists?

Dr. KEEN. No; and what is more, his practice was based upon vivisection experiments.

Senator GALLINGER. Dr. Tait, as I understand, laid great stress on cleanliness.

Dr. KEEN. Yes.

Senator GALLINGER. Now, as to Dr. Benjamin Ward Richardson, I read with much interest his little book called Biological Experimentation. I have it in my committee room. He was a practical vivisectionist, and after a long series of years of distinction as a surgeon and vivisectionist he wrote that book, in which he practically condemns vivisection. I suppose you are familiar with his writings?

Dr. KEEN. I have never read his book, so that I could hardly speak of that; but I can speak with reference to Mr. Tait's cleanliness. It was only because Lord Lister (then Mr. Lister) showed what surgical cleanliness was that Mr. Tait got the results he did.

Senator GALLINGER. Dr. Tait is dead, but it seems to me that his work speaks for itself, and you gentlemen must at least admit that there are some most distinguished physicians and surgeons who take issue with you.

Dr. KEEN. A very few, I am perfectly willing to admit that; but only a very few.

Senator GALLINGER. What knowledge have you of the advances made by vivisectionists that have led them to progress from the brute creation to the human creation in making these so-called vivisection experiments?

Dr. KEEN. I presume that you refer to a pamphlet issued by the American Humane Society. I have only to say in reference to it that there were a number of experiments which I would utterly condemn. Of the experiments narrated in that pamphlet I have looked up every one that I could. Only two are alleged to have been done in America. Many of them are so vague and indefinite that I could not look them up, but as to those that I could, some are garbled and inaccurate; not all of them, observe.

Senator GALLINGER. Some of them?

Dr. KEEN. Some of them.

Senator GALLINGER. Have you observed two dispatches—I took occasion to put them in print once—one from Berlin and one from some other city on the Continent of Europe, in which with some particularity the matter of human vivisection was paraded before the *world. Are you familiar* with those dispatches?

Dr. KEEN. No, sir; I do not remember them or recall them at the moment.

Senator Gallinger read the following:

"LONDON, January 26, 1899.—The Vienna correspondent of the Morning Leader says: 'It has been discovered that the physicians in the free hospitals of Vienna systematically experiment upon their patients, especially new-born children, women who are enceinte, and persons who are dying. In one case the doctor injected the bacilli of an infectious disease from a decomposing corpse into 35 women and 3 new-born children. In another case a youth who was on the high road to recovery was inoculated, and he died within twenty-four hours. Many dying patients have been tortured by poisonous germs, and many men have been inoculated with contagious diseases. One doctor who had received an unlimited number of healthy children from a foundling hospital for experimental purposes excused himself on the ground that they were cheaper than animals.'"

"VIENNA, January 25, 1899.—The Deutsche Volksblatt makes some startling charges against hospitals here. It alleges that vivisection is practiced in the charity hospitals, and declares that many patients have undergone needless operations, which were made solely as experiments. Eighty cases are cited of children being inoculated with disease germs, and it is alleged the same thing was done in maternity cases, so that infants were born suffering from loathsome diseases. The victims number into the hundreds. The Volksblatt demands the suppression of these outrages.

Senator GALLINGER. Those dispatches I put in print myself, taking them from the American press—some reputable newspaper, possibly the Washington Post. I have never seen any suggestion from any source that they did not communicate facts. Have you any knowledge of anything of that kind going on in this country?

Dr. KEEN. No, sir; I have not. I can only say in reference to those that the references are so vague that it would be impossible for me either to verify or disprove them. Moreover, in scientific matters newspaper reports are hardly accepted as evidence.

Let me call your attention, Mr. Chairman, to this fact. So long as surgeons were punished if they failed in anatomical knowledge, and at the same time were denied every means of obtaining that knowledge by any lawful supply of anatomical material, our graves were desecrated. We know now that they are not desecrated, for the reason that an enlightened sentiment has come to bear on the community and unclaimed bodies are now used for dissection. So with animal vivisection. If you are going to stand still, well and good. If you are going to advance, someone must use some new method and must try it either on a man or on an animal.

When cocaine was discovered Koller put the first drops into the eye of a rabbit and determined that it was a local anesthetic, and now its benefits are diffused to all mankind, but I venture to say that no person in this audience would have been willing to have the first drop of cocaine put into her or his eye, not knowing but that it would be followed by the loss of the eye. If you refuse permission for animal experimentation, what other means of progress is there but to try new operations or new drugs on human beings? I do not want to do that. I want to try those new things on aminals first, and if they prove suitable, then it is proper to extend them to the human race.

Senator GALLINGER. A lady in the audience has asked me to inquire of you whether an operation on an animal is conclusive as regards a similar operation on a human being?

Dr. KEEN. Allow me to answer that by mentioning the operation I mentioned a few minutes ago in brain surgery. If you compare the brain of an animal and the brain of a man, a superficial observer would say that they are very different, but when you come to study accurately the different fissures and the various convolutions of the brain, you will find that really they are identical. There is the fissure of Rolando in the one and in the other. There is this fissure and that fissure in the one and in the other, with certain differences of detail, etc., but essentially they are the same. An illustration was used by Dr. Cochran this morning, drawn from an incident connected with a recent trial, in which some guinea pigs were not in the slightest degree inconvenienced as a result of a poison that nearly killed a man. Now there are those minor differences. For example, you can scarcely poison a bird with belladonna, while a man can be poisoned very readily by it. Those are exceptions. The rule is that animals and men are affected alike. That is as one would suppose; because we are all members of the animal kingdom, and practically the great majority of medicines and diseases act alike in man and animals.

Senator GALLINGER. This series of questions as to human vivisection, if you will bear with me, will not be repeated to the other gentlemen, but I am profoundly interested in the subject, and I wish to know how far this practice of vivisection may be carried.

I now turn to a pamphlet issued by the American Humane Association, Chicago, 1899, and I am going to ask you about certain matters that appear in that pamphlet. I think I have seen them in other publications. First, I will say that I was startled a number of years ago in reading a paper from a Dr. Pyle, of Canton, Ohio, in which he openly advocated human vivisection. That was the first time my attention was called to it, and I have the impression that a bill was introduced into the legislature of Ohio to legalize it, but it was not enacted into law. Starting at that point, I have felt some interest in it, and while I have made no special investigation I have tried to confirm certain statements—one or two that came from Europe. I wrote letters to medical men there with whom I happened to be acquainted, and they stated to me that it was the general belief there that those statements were true. This pamphlet contains a statement of some experiments performed in Johns Hopkins Hospital——

Dr. OSLER. Excuse me, Mr. Chairman; it was not in Johns Hopkins.

Senator GALLINGER. Well, they are printed in the Bulletin of Johns Hopkins.

Dr. KEEN. Dr. Osler can answer that question better than I can.

Senator GALLINGER. Now, here is a case in 1896——

Dr. KEEN. In my answer to your last question I spoke generally.

Senator GALLINGER. I will ask that question of Dr. Osler later. You are familiar of course, Dr. Keen, with the experiments made by Magendie, Mantegazza, Goltz, and others, in vivisection. Let me ask whether, if similar experiments were made in the District of Columbia, you would appear here protesting against legislation to control them?

Dr. KEEN. I do not understand that any of the persons you mention, *Magendie,* or Mantegazza, or Goltz, have advocated human vivisection.

Senator GALLINGER. I believe you are right. They performed very cruel experiments on animals. It was Sanarelli that I meant to inquire about. Then I will put the question in this way: Admitting that human vivisection were being practiced in the District of Columbia; that children in our hospitals were taken and inoculated with loathsome diseases; that pregnant women were so treated, and criminals so treated for the purpose of demonstrating facts, would you think it wrong for Congress to undertake to prevent such experiments?

Dr. KEEN. I venture to say, Mr. Chairman, that every gentleman and every lady here acting with me would protest against it most vigorously.

Senator GALLINGER. Then you admit that there may be proper legislation in regard to vivisection?

Dr. KEEN. That is quite a different question. As to human vivisection, I do not think it is to be advocated at all. It is for that reason that we advocate animal vivisection as a duty.

Senator GALLINGER. Do you think it is improper that Congress should enact a law saying that a dog or a horse should be put under the influence of an anesthetic, before being cut to pieces or the nerves being torn from a dog's brain? Do you think that that would be improper legislation?

Dr. KEEN. I think that it would be most unwise legislation, sir.

Senator GALLINGER. That is all I wish to ask. I am much obliged to you.

Dr. KEEN. I will now introduce Prof. H. A. Hare, professor of therapeutics in the Jefferson Medical College, Philadelphia.

Senator GALLINGER. If you will pardon me one moment, I understand that Bishop Lawrence, of Massachusetts, is here, and is anxious to get away, and I shall feel obliged if Professor Hare will give way for a few moments.

Professor HARE. With pleasure, sir.

Senator GALLINGER. We shall be glad to hear from Bishop Lawrence.

REMARKS OF BISHOP LAWRENCE, OF MASSACHUSETTS.

Bishop LAWRENCE. Mr. Chairman and gentlemen of the committee: I should not venture to come in here at the request of one of those interested, as from Massachusetts, without feeling that legislation for the District of Columbia has a much wider influence than legislation in perhaps any given State. It is taken, to a certain degree, as a norm, or at least as an example. Being interested in this subject in the State of Massachusetts, I have felt that any action that might be taken here for the District of Columbia might have a tendency toward influencing the legislation of the State of Massachusetts. I have only two or three words to say, and those rather of a general import.

The reason that I feel that vivisection, while it should be limited by law under certain conditions, should be given large liberty, is this: When anyone of us is in pain we send for a physician; when any of our children is in pain we send for a physician. We look upon the fraternity of medicine as being certainly as wise as any body of men and, I should say, as more humane—as more intelligently humane than any body of men. And the one argument that weighs most heavily upon

me is this: Here is a great body of educated, intelligent men in whom we trust for ourselves, and I am disposed to trust them in the matter of animal vivisection. That is my whole story.

Throughout my entire life I have had a large acquaintance with physicians. They have been companions and friends. I have never known an instance of any physician being unnecessarily cruel, or cruel at all, in relation to vivisection. The physician takes it up as a duty to science.

There is one other thought, and that is this: We all know that in discovery one never knows where his experiments are to lead. In mechanical discovery it takes thousands of experiments in order that one discovery might be made, and that discovery may be made in an entirely different line from that which the experimentor expected. Now, in vivisection there are a large number of experiments made and there is said to be a great waste of life. It surely is worth while if, by that so-called waste of life, there may come forth, even though in a line least expected by the experimentor, some discovery which is to save human life. Therefore, while there may be a great deal of what is called "waste," there comes from that something that is many-fold worth more than the waste.

May I suggest simply one other thought? I am receiving many pamphlets on this subject, and I take those pamphlets to physicians. Those physicians' names have been quoted as being guilty of this, that, or the other deed of cruelty. I take the pamphlets to learn the facts, and I find that the facts do not accord with the statements. They do not disturb me, for I have confidence in the medical profession, but I do feel that the very wide distribution of pamphlets by persons who no doubt believe what they write, but who are not exact in their statements, tend to create a distrust in the most beneficent profession.

I feel, therefore, that legislation which may be passed here should be such as will tend toward inspiring greater confidence in the profession that we most value, because, that done, they can be trusted, I believe, and the people will not be made restless.

I am much obliged to the committee. I did not wish to take up so much time.

Senator GALLINGER. You do not, I suppose, Bishop Lawrence, wish to produce the impression on this committee that in your opinion the opponents of vivisection are reckless in the assertions they make in these matters, and that they are undertaking to mislead the people, do you?

Bishop LAWRENCE. Not at all; not consciously to mislead the people, because I should be speaking then of my friends, but I think they are not always exact in the weighing of evidence.

Senator GALLINGER. That point came up as between the medical gentlemen and the general public in connection with the Harvard Medical School. It was denied that a certain class of experiments had been made, and it was afterwards proved that they had been made there and were published. So that in that case the doctors were the parties mistaken.

Now, Professor Hare, you can have twenty minutes.

STATEMENT OF PROF. H. A. HARE, PROFESSOR OF THERAPEUTICS IN THE JEFFERSON MEDICAL COLLEGE, PHILADELPHIA.

Mr. Chairman and gentlemen of the committee: I may say, in opening, that the chair of therapeutics, which I occupy in the Jefferson Medical College, is the chair which has to do with the treatment of diseases. The technical title may not be so well understood.

I have been asked to say a few words to the Senate Committe on the District of Columbia in regard to the value of experiments on animals to medicine in distinction from surgery. In doing so, it is proper for me to state that I represent the practically unanimous opinion of the medical profession when I assert that the value is beyond computation; and I think it is worthy of note that you have had sent to you a large number of protests against this bill from incorporated medical bodies, and not a single set of resolutions in favor of this bill from any regularly organized medical association. This bespeaks a singularly unanimous view.

Another point which is worthy of note is that most of the medical men who appear before you to-day are not those whose work will be directly obstructed if this bill becomes a law, but in many instances are men of large practice, who appreciate the value of the labors of their more scientific brethren and desire still greater beneficial information.

The advocates of this bill have quoted from the writings of several men well known to the profession at large as being opposed to vivisection. Single instances of opposition to anything are not difficult to find in any walk of life, and they ought to be of no weight when they are practically unique. One of the men quoted was in his dotage when he spoke against vivisection. Another, while a dexterous surgeon, was a professional Ishmaelite because of his personal characteristics and poor judgment. Perhaps I may be allowed to point out that for every so-called eminent but dead medical man quoted as in favor of this bill there are fifty living ones against it; and that this is true is shown by the fact that you have to-day before you, with the exception of myself, men more eminent in the medical profession than can be found named in all the papers of those favoring the bill. That such men should come many miles to oppose legislation which only indirectly invades their interests indicates how important it is to the medical advance that this bill shall fail.

When we come to a discussion of the advantages which have accrued to medicine as a result of animal experimentation, we find that they may be divided into two great classes.

In the first class we find instances which are so striking that they mark epochs in medicine; in the second, we find a far greater number of instances in which inestimable advantages have accrued by the gradual accumulation of learning. Just as there are a comparatively few major incidents which have made this nation what it is to-day, and many thousand minor occurrences which really give it its greatness and stability, so the advancement of medical science has been occasionally by great bounds, but more often by a gradual increment in value, which more slowly and more surely, even if less strikingly, has enabled us to treat many diseases with success.

When you recall the fact that for the first 1,600 years of this era it was thought that one of the main blood vessels attached to the heart contained "smoky fumes," and that Harvey, by the use of living animals, showed the *circulation* of the blood in our bodies; when we recall

the fact that practically our entire knowledge of the acts of respiration, digestion, and the action of the kidneys depends upon studies upon the lower animals, it is staggering to think what would have been our state of knowledge to-day had these original workers, who have gone before us, been retarded.

Only one who has felt the poverty of his knowledge when standing at the bedside of a dying man, whose weeping children implore him to do something to save life, can understand why we come to ask that this well-meant, but mistaken bill be not passed.

If there is any man here who has lost a child of diphtheria, he can appreciate what it is to know that, solely because of the use of living animals, medical science could probably save that child to-day, and that instead of 42 dying out of every 100, only 4 die, and they chiefly because they come under treatment too late to be saved. For ten years the mortality from diphtheria in Harper Hospital, Detroit, was 40 per cent; now, with the antitoxin treatment, it is less than 4 per cent.

I may quote the following from the last official report of the board of health of the city of Baltimore:

One of the most important functions of the board of health is the distribution of antitoxin for indigent cases of diphtheria. Where circumstances render the complete isolation of the case impossible, antitoxin is used in order to immunize all those exposed to the disease. The results of the immunization and the results of the curative value of antitoxin is very gratifying, since, in addition to saving the lives of many that would otherwise have died of diphtheria, the spread of the disease has been restricted. As an immunizing dose 1,000 units have been used, and in treating a case of diphtheria, 2,000 units. This has been followed by an injection of 2,000 or 4,000 units if the case does not show decided improvement, and in some instances from 7,000 to 10,000 units have been used in treating one case; in one case 15,000 units were injected, 2,000 units being administered every eight hours.

This report states that the mortality from diphtheria during the past year—

	Per cent.
1899 was	4.61
1898	5.73
1897 (the first year antitoxin was used)	23.27
1896 (without antitoxin)	51.87
1895 (without antitoxin)	71.42
1894 (without antitoxin)	74.15

You can thus see what a tremendous influence antitoxin has had. Although in 1897 but comparatively few physicians had started to use antitoxin, and the city was not furnishing it for the indigent cases, the percentage of deaths was reduced from 51 to 23 per cent, and in 1898, the first year that antitoxin was freely used, the percentage of mortality resulting from diphtheria was but 5.73 per cent; in 1899, when practically all physicians were using it, 4.61 per cent.

In Billing's report to the director of the bacteriological laboratories of New York, Dr. Biggs, the following table is found:

TABLE 1.—*Number of cases, deaths, and mortality (per cent) of diphtheria in the boroughs of Manhattan and the Bronx from 1891 to 1899, inclusive:*

Period.	Cases.	Deaths.	Mortality.
			Per cent.
1891	5,364	1,970	36.7
1892	5,184	2,196	40.6
1893	7,021	2,558	36.4
1894	9,641	2,870	29.7
1895	10,353	1,976	19.1
1896	11,399	1,763	15.4
1897	10,896	1,590	14.6
1898	7,593	923	12.2
1899	8,240	1,087	13.1

The antitoxin came into general use in 1894 and 1895.

In the city of Philadelphia there are to-day living several hundred children who would have died last winter had they not received diphtheria antitoxin, yet does any one suppose that the illness and death of the few guinea pigs used in the primary test of the diphtheritis serum and the illness of the horse, who gave his antitoxic serum, while still well enough to take several miles of exercise a day, equals the physical suffering of those children, or the mental anguish of one of their parents, or the commercial value of one human life?

To express it briefly, thousands of children are alive to-day as the result of the death of a few hundred guinea pigs.

Nor is this the only instance that could be cited. At the present time smallpox is a rarity because of vaccination with cow pox. If you visit one of the great vaccine establishments you will see heifers strapped upon their backs, their bellies shaved and scrubbed and finally scarified, while they moo their protests. After this they are carefully wrapped up in antiseptic cloths and put to bed in perfectly clean straw, and after some days are again tipped over, greatly to their discomfort, and the vaccine matter taken from them. I don't suppose that the process of scraping the skin from the belly wall is particularly pleasant to the heifer, but the vaccine so obtained results in placing the frequency and mortality of smallpox so low that it is no longer one of the scourges of mankind, and almost every person who walks the streets does not, as at one time, bear the scars of the disease.

I may quote here an editorial on this subject in the Journal of the American Medical Association, February 17, 1900, as follows:

So conclusive is the evidence in support of the efficacy of vaccination and revaccination in the prevention of smal pox that there would be no occasion for extended discussion of this subject, were not attempts persistently made to discredit the statistics or to attribute the results to other influences. It can not be successfully denied that the prevalence of, as well as the mortality from, smallpox has diminished enormously since the general adoption of vaccination and revaccination. In addition, the severity of the disease in individual cases has diminished, and disastrous complications, so commonly observed in the past, are to-day rare and exceptional; and there is practically no evidence whatever that this improved condition of affairs can be ascribed in any notable degree to any other factor or combination of factors. There is absolutely no ground for the opposition that is manifested in some places to this most beneficent procedure.

It is recorded that during the eighteenth century fully two-thirds of all children born in Europe were sooner or later attacked by smallpox, and that on an average one-twelfth of all born succumbed to that disease. There occurred annually in the city of London from 1771 to 1780 an average of 50,000 deaths from all causes among every million of the population, including 5,020 from smallpox; from 1801 to 1810 the figures were 29,200 and 2,040 respectively; from 1831 to 1835, 32,000 and and 830 respectively; from 1854 to 1871, 24,200 and 388 respectively; and from 1883 to 1892, 19,800 and 73 respectively; so that while the total death rate has diminished about 60 per cent in 121 years, that of smallpox has diminished 98.5 per cent. For the whole of Great Britain the annual death rate from smallpox has diminished from 1,064 (per million) in 1838 to 27 in 1894; in 1889 it was 1; in 1890 nil; in 1891 2. Although vaccination came into use in England in the first years of the present century, provision for its gratuitous performance among the needy was not made before 1840. It did not become obligatory until 1853, and legislation for its systematic enforcement was not enacted until 1871.

It is stated that in Iceland, in 1807, among a population of 50,000 there were 18,000 deaths from smallpox.

Revaccination was made obligatory in the German army in 1834, and among all classes of the community in 1874. The effect was at once seen in the mortality from smallpox, which was almost eradicated in the first instance and greatly reduced in the second. In the years 1870 and 1871 the German army lost by smallpox 459 men among a million, while the French army, though smaller in number but without rigorous vaccination requirements, lost 23,400 from the same cause. From 1875 to 1887 one death occurred from smallpox in the German army, and this from a soldier who had been revaccinated unsuccessfully, while in the French army from 1875 to 1886 there were 550 deaths from the same cause, or 45.8 per annum, and in the Austrian army, likewise without rigorous vaccination requirements, from 1875 to 1881 595 deaths from smallpox, or 85 per annum. Throughout Prussia, in 1872, the number of deaths per 100,000 of the population from smallpox was 262, and in Austria 189, while in 1884 the figures were 1.4 and 50.8, respectively. Vaccination has been obligatory only for recuits in Austria since 1886. Vaccination was optional in Sweden between 1801 and 1810. In the latter year it became obligatory. In the prevaccinal period, from 1774 to 1801, there occurred annually an average of 2,050 deaths in the million from smallpox; during the period of optional vaccination the mortality had fallen to 686, and from 1810 to 1855 it was 169. From 1816 to 1893 it averaged 155, and from 1884 to 1894, 2.

In Bohemia, in the period between 1796 and 1802, before vaccination was adopted, there occurred, in a population of 3,039,722, annually 94,955 deaths, of which 7,663 were due to smallpox; while between 1832 and 1855, when vaccination was obligatory, there occurred, among a population of 4,248,155, annually 113,412 deaths, of which but 287 were due to smallpox. Between 1758 and 1802, before vaccination was employed, the average mortality from smallpox in the city of Berlin was 8 per cent of the total, while in the early years of the nineteenth century this was reduced to 6.7. Between 1810 and 1814 it had fallen to 0.7 per cent, while between 1815 and 1869 it had varied between 0.06 and and 1.34 per cent, averaging 0.8 per cent.

During the seventeenth and eighteenth centuries epidemics of smallpox were frequent in Massachusetts. In 1721 nearly 8 per cent of the population of Boston died from that disease. From the introduction of vaccination in 1800 to 1840 the number of deaths from smallpox was not more than 20. In 1836 the vaccination laws were modified and made less stringent than they had been, and the deaths therefrom greatly increased. There occurred between 1839 and 1841, in Boston, 232 deaths, and from 1842 to 1855, throughout the State, 1,304 deaths; while in 1886 and in 1895 there were no deaths whatever from this cause.

Of the importance of thorough vaccination and repeated revaccination, the comparative figures of the London Smallpox Hospital from 1836 to 1857, dealing with 13,755 cases, are demonstrative. Of 3,094 cases received between 1836 and 1851 there were 35.5 per cent of deaths among the unvaccinated, 21.7 per cent among those said to have been vaccinated but presenting no cicatrix; 7.6 per cent among those presenting a single cicatrix, 4.3 per cent among those presenting two, 1.8 per cent among those presenting three, and 0.7 per cent among those presenting four cicatrices. Among 10,661 cases received between 1852 and 1867 there occurred 34.9 per cent of deaths among the unvaccinated, 39.4 per cent among those said to have been vaccinated but presenting no cicatrix; 13.8 per cent among those presenting one, 7.7 per cent among those presenting two, 3 per cent among those presenting *three, and 0.9 among* those presenting four cicatrices.

The following comparative figures illustrate the favorable influence exerted by vaccination, not only on the morbidity but also on the mortality and also the greater prevalance of smallpox in early life. In an epidemic in Sheffield, between 1887 and 1888, it was found that of vaccinated children under the age of 10 years, 5 in 1,000 were attacked by smallpox, with a death rate of 0.09, while of unvacciated children 101 in a thousand were attacked and the death rate was 44. Of persons above the age of 10, vaccinnated twice, 3 in 1,000 were attacked, with a death rate of 0.08; of those vaccinated once, 19 were attacked, with a death rate of 1, and of those not at all vaccinated 94 were attacked, with a death rate of 51.

In a paper read before the First Pan-American Medical Congress, W. M. Welch related that among 4,907 cases of smallpox observed at the Municipal Hospital of Philadelphia between 1870 and 1893, there were 1,412 with good vaccination cicatrices, with 124 deaths—8.8 per cent; 666 presented fair cicatrices, with 98 deaths—14.7 per cent; 1,070 presented poor cicatrices, with 290 deaths—27.1 per cent, while 1,759 presented no evidence of previous vaccination, with 1,027 deaths—58 per cent. Of 128 patients admitted to the hospital in 1899 it was ascertained that 110 had never been vaccinated, while 17 had been in infancy and 1 after exposure.

There were reported to the Ohio State board of health, between April, 1898, and April, 1899, 1,428 cases of smallpox, with 18 deaths, 1.26 per cent. Nearly 40 per cent of the cases were in adults. The statement is added that vaccination has proved an almost absolute specific.

Of 1,106 cases of smallpox observed at the Quarantine Hospital, at Baltimore, 441 had been vaccinated successfully, and 20 unsuccessfully, while 645 had not been vaccinated at all. Among the first group there occurred 63 deaths, 14.3 per cent; among the second, 6 deaths, 30 per cent; and among the third, 315 deaths, 48.8 per cent.

In an epidemic of smallpox in Birmingham, Ala., in 1897-98, investigated by the United States Marine-Hospital Service, 225 cases were treated, of which 219 were in colored persons, and 6 in white. Of the whole number, 106 had never been vaccinated, and 101 unsuccessfully; 2 presented good scars, 5 doubtful ones, and 7 had been recently vaccinated. The epidemic was controlled by house-to-house and personal inspection, isolation, vaccination, and disinfection.

Smallpox has been excessively prevalent in the Philippines, 250 deaths formerly occurring in Manila alone in April and in May, but since vaccination has been instituted by American surgeons but few cases have occurred and no deaths.

Under the influence of vaccination a constant diminution in the number of cases of smallpox has also been observed in the Italian army since 1867, and the mortality has been reduced to almost nil.

Finally, it may be added that of physicians, nurses, attendants, and others who come into more or less intimate relations with smallpox patients, but are thoroughly vaccinated, practically none is ever attacked by the disease.

Figures and statements like the foregoing, and they could be multiplied almost indefinitely, can not but carry conviction to any unprejudiced mind; but some of those unwilling to be convinced, but who can not deny the accuracy of the statistics, seek to attribute the results to causes other than vaccination, as, for instance, general improvement in sanitation, overlooking the fact entirely that the morbidity of, and the mortality from, no other disease have been reduced in anything approaching the degree in which these have been influences in the case

of smallpox. It is therefore the bounden duty of the State to see that the welfare of the many is not jeopardized by the prejudice or the ignorance of the few, and wherever intelligence and conservatism prevail vaccination and revaccination should be made obligatory.

From far Japan comes the announcement that the Imperial Government has decided to make vaccination compulsory, primary vaccination to be performed at or before the tenth month, revaccination at 6 and again at 12 years of age. The general adoption of this rule would aid in the realization of the hope expressed by Jenner that "the severest scourge of the human race" might be eradicated. For those who suggest out of their inner consciousness that the disappearance of smallpox would be followed by the evolution of some worse disease or condition, as also there are some who contend that the eradication of tuberculosis would be followed by some other more serious distemper, all discussion would be futile. The dangers and accidents of vaccination are practically insignificant, particularly since vaccine virus from the calf or the cow is employed almost solely, and what is of still more importance since the introduction of glycerinated lymph. At the present time there is in India an epidemic of the plague which, in different centuries, has killed myriads of human beings.

The first appearance of the bubonic plague in Europe seems to have occurred in the sixth century. In Constantinople it is said to have caused as many as 10,000 deaths in one day. It reached England in the seventh century. In the fourteenth century it proved epidemic in eastern Asia, northern Africa, and nearly the whole of Europe. Again in the fifteenth century it spread over Europe, and in 1466 the mortality reached 40,000. It again prevailed in the sixteenth century, and in 1572 as many as 50,000 of the inhabitants of Lyons died of it, and Venice lost 70,000 inhabitants. In 1656 it became violently malignant at Naples, and is said to have killed 300,000 persons in five months.

In London in 1664 and 1665 a great epidemic prevailed with 68,596 mortality.

In 1720 there was an epidemic at Marseille with 40,000 to 50,000 mortality, other European cities being visited with large death lists.

In 1771 it carried off 50,000 of the inhabitants of Moscow. In the nineteenth century the disease subsided in Europe, and slight outbreaks occurred in Italy and Greece only. The last epidemic occurred in 1835 in Cairo, when the number of deaths is said to have been equal to the entire adult male population. A slight outbreak occurred in 1879 on the banks of the Volga.

In 1893 the plague made its appearance in China at Longtehen and was conveyed by trading junks to Canton and Hongkong, which cities suffered from a considerable epidemic in 1894. In 1896 and 1897 it broke out in Bombay, in which epidemics there has been a total of 220,607 cases and a mortality of 164,083. In Hongkong 1,600 cases with 1,541 deaths are reported, and in Amoy there have been 540 deaths, in Calcutta 500 deaths, and in Formosa 1,866 deaths. Medical men are generally agreed that the only prospect of combating this malady is by studying it in animals.

A study of this disease has proved that the micro organism which produces it is of itself not particularly virulent in man, but if perchance a rat eats of food containing the germ, it finds so favorable a spot for its growth in the rat's body that it then becomes most malignant, and if then it gains access to a man's body speedily produces death. Experiments on animals have shown that one of the ways to combat plague is to destroy rats which grow and carry the germs, and ships

are now provided with protected hawsers so that rats can not pass from the wharves to the decks.

They have also shown that a preventive inoculation can be made which will prevent the disease in man. Even if it required the lives of many animals in one year, would that sacrifice not be proper to save that number of human lives lost in Bombay alone?

So much for instances of epidemic diseases.

A number of years ago Dr. Brunton, of London, noticed that if he gave a certain member of the so-called nitrite group to one of the lower animals this drug relaxed the blood vessels. He recalled the fact that in angina pectoris there was nearly always a state of excessive contraction of the blood vessels, and giving nitroglycerin to a case of angina pectoris relieved him and many hundreds like him of a pain which, in its agony, passes the ability of even the patient himself to describe.

There is a curious disease called myxedema, which, coming on in adult life, gradually changes a healthy, active man or woman into an idiotic, swollen, abhorrent looking creature. Until within a few years no one knew how to do anything for it, until Horsley and others removed the thyroid gland from monkeys and found that they soon developed similar changes. It was a fair conclusion that absence of this gland from the human body caused the disease, and now it can be cured by giving the gland from the sheep to man. (Show comparative pictures.) A child born with the lack of such a gland becomes a horrible looking object, called a *cretin*, yet thyroid gland can cure it.

What I have stated to you in the last few minutes is certainly sufficient evidence that the use of animals for experimental purposes is of great advantage, not only to man, but to animals themselves. Even those who advocate this bill apparently admit that this line of investigation is fruitful of good, or they would not try to abolish the whole custom. They don't wish to abolish it, but they want to hamper it by instituting an inspectorship affair in which the trained investigator can have his license revoked if some well-intentioned but ignorant person or persons see fit. There is no need for such interference, for the health and life of the animal used is so valuable to the results in view that abuse will not arise. In reply to this the advocates of the bill bring forward certain instances in which persons using animals have abused them, and on this basis assert that control is needed.

Everyone who hears me to-day knows that anyone who will can collect from the history of every walk of life instances of abuse, which by no means impair the usefulness of that class. Some years ago, when I was traveling in the far West, a newsboy passed through the train crying out a book entitled "The Crimes of Ministers"—a condemnation of the fact that clergymen sometimes fall by the way, but does anyone suppose for one moment that because a few of the clergy fall from grace they must be all of them inspected? On the contrary, it but illustrates the fact that more ministers are needed to help their fallen brothers, and prevent the moral pervert from compiling such a vile volume. If the advocates of this bill really wish to prevent useless cruelty to animals let them stop pigeon shooting and fox hunting; let them license cab drivers to carry whips, which shall be taken away if perchance, in the opinion of a passer-by, the whip is used when it need not be; and, last of all, let any one of them come and stand with me beside the bedside of a child gasping in diphtheria, refuse it that specific which thousands of doctors and hundreds of thousands of children know to be their salvation. Last of all, let him, as the early symptoms of this malignant disease come upon him, refuse himself

that specific which all men know he needs, and as he fights for breath let him, with his last gasp, refuse his children that remedy derived from the horse, which will not only cure them if attacked, but even protect them from its onset.

To those who fail to recognize the advance of medical science, the children and their parents may well say, in the words of the greatest of all physicians, "Father, forgive them; they know not what they do."

Senator GALLINGER. As to antitoxin, let me inquire, Professor Hare, if you have read this bill?

Professor HARE. I have.

Mr. GALLINGER. Have you discovered anything in the bill that prevents the use of antitoxin or vaccine?

Professor HARE. No; I believe not.

Senator GALLINGER. Or the use of any serum treatment, or anything of that kind?

Professor HARE. I believe not.

Senator GALLINGER. What were the statistics you gave concerning mortality from diphtheria a few years ago and now—in brief, the results as you gave them?

Professor HARE. In Baltimore the deaths were formerly 75 per cent; now they are 4 per cent. Those figures are from the official returns by the Baltimore board of health.

Senator GALLINGER. I think I ought to have removed to Baltimore when I was practicing medicine. A young scientist in my city, a brilliant fellow, has recently published a pamphlet in which he makes some claims, not so great as you have made in regard to the degree of mortality in diphtheria under the antitoxin treatment, but he goes on further to say that the old men in the profession were ignoramuses and did not know what diphtheria was; that now they examine the throat and find multitudes of cases where there is no secretion or deposit in the throat, but where there is a little inflammation merely, and they treat it as diphtheria. Now, may it not be that in the pursuit of science you gentlemen may have taken from us all our cases of angina and tonsilitis and those cases that we did not pay much attention to, but which you are treating as diphtheria and applying your remedies, and thus you swell your percentage of so-called cures?

Professor HARE. That is a very proper question, Mr. Chairman. The reply is that no reputable health board would publish a large body of statistics without being sure of their ground. It is perfectly possible to recognize the micro organisms causing diphtheria. It is therefore possible for any doctor to take a piece of cotton and rub it over the sore, and before any bacteria develops to have that piece of cotton and the matter from the sore examined. He can send that to the bacteriological studio, and the patient can be treated before the development of the membrane.

Senator GALLINGER. Is it not possible to treat such cases with medicine before the development of the membrane?

Professor HARE. No, sir; I think not. It could to a certain extent be modified, but it could not be aborted. If I were in charge of an infant asylum and a child came to me with a bad throat, I should feel it my duty to send something from that child's throat to the bacteriological studio. If I found some micro-organisms in the throat I would protect the other children by treating the throats of all of them with serum, which is perfectly harmless. It has been proved that in the case of plague an application of this antitoxin heads off the disease, and the people's lives are saved.

Senator GALLINGER. Are there not well-marked differences of opinion in the profession as to the utility of these experiments?

Professor HARE. If you mean that there are individuals who differ with me, that is so; but if you mean that there are eminent men, it is not. There is one gentleman who is writing to show that antitoxin is not valuable.

Senator GALLINGER. Is that Dr. Winter?

Professor HARE. Yes, sir.

Senator GALLINGER. There are others, are there not?

Professor HARE. None that I think are eminent.

Senator GALLINGER. Are you familiar with the works of Lennox Brown, of London, who says that antitoxin is not valuable?

Professor HARE. I am not familiar with his works, but it is an instance in which there may be a few who disbelieve; but they are as nothing in comparison with the multitude who do believe.

Senator GALLINGER. I have been interested in your mortality rates. Are you familiar with the mortality rates from all diseases in this country for the last ten years, making a comparison by years?

Professor HARE. No, sir; because I believe that no one but a trained statistician could claim to be familiar with them. I am familiar in a general way with most of the statistics concerning infectious diseases, and I can say there has been a very extraordinary decrease in all infectious diseases within ten years.

Senator GALLINGER. Of course no two epidemics of infectious diseases are exactly alike.

Professor HARE. No; it is exceedingly difficult to base any statistics on any one or even ten epidemics.

Senator GALLINGER. I fully agree with you. On this point I will here insert a paper by Dr. J. Edward Herman, of Brooklyn, N. Y., being a reprint from the Medical Record of May 27, 1899, entitled "The Failure of Antitoxin in the Treatment of Diphtheria." It will be observed that Dr. Herman claims that the mortality has increased under the antitoxin treatment.

THE FAILURE OF ANTITOXIN IN THE TREATMENT OF DIPHTHERIA.[1]

By J. EDWARD HERMAN, M. D., *Brooklyn, N. Y.*

[Reprint from the New York Medical Record, May 27, 1899.]

In a statistical study of the antitoxin treatment of diphtheria it must not be forgotten that in late years there has been a decline in the death rate of other infectious diseases than diphtheria, against which no new remedy has been directed. Thus the typhoid fever death rate from 1877 to 1894 in German cities of over 15,000 population averaged 29 deaths per 100,000 inhabitants, but between 1895 and 1898 it fell to 10. Gottstein[2] gives the diphtheria mortality, from 1877 to 1894, in these same cities, as 106 per 100,000 population. During 1895 to 1898 the rate was 44.

	1877–1894.	1895–1898.	Decline.
			Per cent.
Typhoid fever	29	10	65
Diphtheria	106	44	59

[1] Read before the Brooklyn Pathological Society April 13, 1899.

[2] Therapeutische Monatshefte, May, 1898.

Thus while the present diphtheria mortality is still 41 per cent of its former rate, the typhoid fever death rate is only 35 per cent of what it was during 1877 to 1894.

In St. Petersburg, between 1886 to 1889, as Verekoundow[1] points out, the typhoid fever mortality was 7 per 10,000 population and only 4 during 1890 to 1894.

Kassowitz[2] shows that the scarlet fever mortality in the German cities was very much lower in 1896 than in 1895. Below the number of deaths from diphtheria in these two years is contrasted with that from scarlet fever.

	1895.	1896.
Diphtheria	7,634	6,237
Scarlet fever	2,852	1,993

From this it is seen that the scarlet fever mortality decreased 30 per cent and that of diphtheria only 20 per cent.

Much of the decrease in the infectious disease mortality is due to sanitary improvement, and this is one factor which is usually ignored when the antitoxin question is considered. There can be no doubt, as was clearly pointed out by Deming,[3] that "good results are shown in many localities in the reduction of the mortality rate from diphtheria by sanitary measures alone."

Another thing which should be kept in mind is this: Antitoxin statistics are based on the treatment of cases which have been diagnosed as being diphtheria by the microscope and comparison is made with the results of treatment in the past of cases which were diagnosed on their merits as being examples of clinical diphtheria.

Bretonneau[4] said: "The fear which exaggerated the danger magnified the slightest attack of sore throat into the epidemic affection. This circumstance contributed not a little to obscure several important questions relative to therapeutics." History repeats itself when the results of antitoxin treatment are based on bacteriological examination. Such a firm believer in antitoxin as Jordan[5] concedes: "It is probably true that the basing of the diagnosis of diphtheria upon a bacteriological examination has led to the inclusion of cases which would formerly have been classed as simple sore throats." Another ardent advocate, Kortright,[6] admits: "Probably part of this decrease may be due to improved methods of diagnosis, by means of which cases formerly called tonsilitis are now classed as tonsilar diphtheria." This factor in increasing the number of cases reported and thus reducing the case fatality is admitted by Lotz[7] and Tavel[8] and others, and it is a fatal admission; it cuts off the last leg of the antitoxin argument. Winters feels[9] "absolutely confident that at the Willard Parker Hospital the mortality has been much higher under the antitoxin treatment than it was before, if we were to exclude the numerous light cases, such as

[1] Indian Medical Record, January 11, 1899.
[2] Ther. Monat., June, 1898.
[3] Medical Record, January 1, 1898.
[4] "Dictionnaire de Médecine," 1826.
[5] Philadelphia Medical Journal, February 18, 1899.
[6] Brooklyn Medical Journal, February, 1896.
[7] Correspondenzbl. der Schweizer Aerzte, 1898, No. 3.
[8] Ther. Monat., August, 1898.
[9] Archives of Pediatrics, July, 1895.

were never seen in the hospital before the use of the serum treatment." The words of Niemeyer[1] should also be heeded: "The reputed successful remedies have usually originated in the last stage of epidemics, at which time the cases are usually milder and recover more frequently even without treatment."

It must be remembered that the diagnostic value of the Klebs-Loeffler bacillus has not been indisputably established. Its presence is not an infallible indication that diphtheria exists. For instance, Allen,[2] while treating a case of diphtheria, took swabbings for culture from the throats of other people in the same house. He says: "The report was returned that they contained the diphtheria bacillus, much to my disgust, and the bacilli continued to be there for three or four weeks longer, with no clinical signs whatever." Dr. Gross, of the Boston Children's Hospital, found the bacilli in 8 per cent of normal throats. On the other hand, Hennig,[3] in a series of 35 cases of clinical diphtheria, carefully examined bacteriologically for him by Professor Esmarch and Dr. Czaplewski, found the Klebs-Loeffler bacillus in only 57 per cent. In 4,054 cases sent to the New York board of health for diagnosis, the examination of 951 was indecisive.[4]

In Basel, Switzerland, notwithstanding there is now a low case fatality, the death rate is higher than it was in any year back to 1881. To make clear that the low case fatality is due to the greater number of mild cases reported, Kassowitz shows that while, for the ten years before antitoxin was used, an average of 245 cases was reported each year, at once in 1895 with the introduction of antitoxin the number reported jumped up to 645, and in 1896 the number had reached 835. "And yet at the present time the mildness of the disease is admitted." Referring to this fact, Tavel[5] confesses that during these antitoxin years every case showing inflammation of the throat and membrane was reported, but he still clings to the belief that the use of antitoxin is partly responsible for the low case fatality. The average yearly death rate from 1885 to 1894, in Basel, was 29 per 100,000 population. In 1895 it went up to 65, and in 1896 it was still 49. This conclusively demonstrates, to say the least, that antitoxin has no power to save life.

To show that more patients now apply at the hospitals for treatment, Purjesz[6] gives the following particulars: More cases were reported in the city of Berlin in 1886 than in the first serum year, 1895. In 1886, 6,988 were reported, and in 1895 only 6,106. In 1895, with 300,000 greater population, 862 less cases were reported than in 1886. He argues that, as the epidemic has fallen off in the number of cases occurring, the disease has become milder in character. Yet with this comparatively small number reported from the whole city in 1895, we find 306 patients entered the Charité Hospital, whereas in former years only about 160 were brought to this institution. It follows that many of these 306 patients in 1895 had the disease in a mild form, and others no doubt had only bacterial diphtheria, i. e., were cases diagnosed as diphtheria because Klebs-Loeffler bacilli were present. Formerly it was usual for the severe cases especially to be sent to the hospital. After antitoxin came into use we must conclude, in view of the fact that while the disease had not spread in the city the applications to

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[1] "Practice of Medicine," 1883.
[2] Archives of Pediatrics, August, 1898.
[3] "Sammlung klinischer Vorträge," No. 157, Leipzig, 1896.
[4] New York City Record, June 28, 1898.
[5] Ther. Monat., August, 1898.
[6] Ther. Monat., July, 1898.

the hospital at once nearly doubled, that very many mild cases were now taken to the hospital. The table below shows the result:

CHARITÉ HOSPITAL.

	Entered.	Died.	Mortality.
			Per cent.
1894-95	306	41	13
1895-96	265	39	14
1896-97	115	20	17
1897-98	156	34	20

In brief, the case fatality has increased year by year from 1894 to 1898 under antitoxin treatment.

In Trieste during 1895, through an agreement between all the physicians of the city, almost every case, in some months every case, was treated with antitoxin. Yet the number of deaths this year, Kassowitz[1] points out, was greater than ever recorded. The deaths ranged from 98 in 1889 to 222 in 1893. But in the antitoxin year 1895, 271 died. Antitoxin was never subjected to a fairer test than this. With practically all the diphtheria cases in the city treated with this reputed specific, nothing can explain away this pitiable result.[2]

The following table gives the mortality rate in some cities during antitoxin years contrasted with the rate which prevailed in the same cities during a corresponding number of years before antitoxin came into use:

Deaths per 10,000 population.

Cities.	With antitoxin.			Without antitoxin.		
	Years.			*Years.*		
Baltimore	2	1896-97	6.4	2	1888-89	5.3
Boston	2	1896-97	9.8	2	1891-92	8.2
London	2	1896-97	5.7	2	1886-87	2.4
St. Louis	3	1895-97	7.5	3	1890-92	5.9
Philadelphia	4	1895-98	11.0	4	1887-90	5.6

Recently Dr. John B. Cosby appeared before the assembly committee on cities in opposition to the bill to prevent the New York City board of health from selling antitoxin, with the preposterous argument that the reduction in the diphtheria death rate in New York City during the past four years was due to antitoxin. He probably did not remind the committee that the general death rate from all causes is now phenomenally low; that there is a decline in the diphtheria epidemic; that an immense saving of life should be credited to the late Colonel Waring's efficient and admirable system of street cleaning, and that much good must have come from the new system of medical inspection of school children. All these facts were passed by, and antitoxin did it all. Yes, it is true the death rate in New York City fell from 15.8 in 1894 to 4.4 in 1898—a difference of 11. But the committee might have learned some further very interesting history.

[1] Ther. Monat., June, 1898.

[2] The disinterested philanthropy of commercial firms in giving free samples of antitoxin for use in hospitals is very touching; but their willingness to inform the profession of the unfavorable results with their antitoxins is not marked. Two firms, whose products are advertised in most drug-store windows, being anxious that the antitoxin manufactured by them should be subjected to a test in the Philadelphia Municipal Hospital, each offered to supply all that would be needed for one month's trial. Dr. Welch, in the Philadelphia Health Board Report for 1897, says this offer was accepted. The result was 26 per cent mortality in September with the Mulford brand and 33 per cent in December with the Park, Davis & Co. preparation! It is needless to say these firms have not distributed circulars broadcast *stating the outcome of this* experiment.

Dr. Cosby might have told this fact: The New York City diphtheria death rate fell from 24.8 in 1864 to 7.4 in 1867—a difference in these four years of 17 deaths per 10,000 population compared with the smaller decline of only 11 in the four antitoxin years 1894 to 1898. This is clearly illustrated in the diagram following:

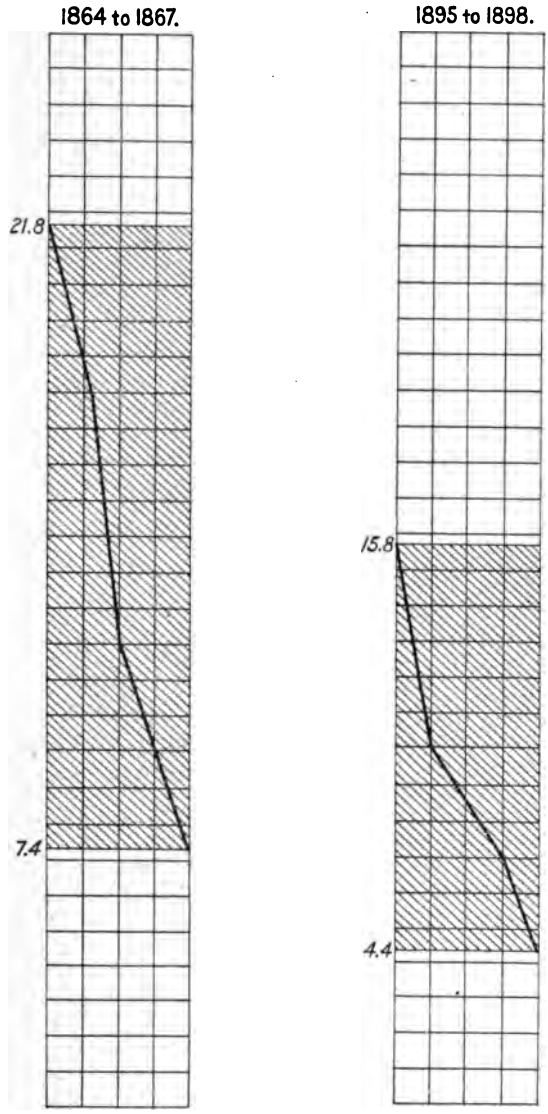

Diagram showing fall in death rate during four antitoxin years and four years before antitoxin.

NOTE.—Each square represents one year, counting from left to right; and each square represents one death per 10,000 population, counting from bottom to top.

Those cities which now have a low general death rate from all causes also show, as would be expected, a low diphtheria death rate. This is true of Chicago and Milwaukee. New York City, which at present has a very low general death rate compared with many years in the past, naturally has a corresponding low diphtheria mortality.

The next table contrasts the number of deaths in different cities during antitoxin years with the number of deaths in the same cities in past years before antitoxin was introduced:

Number of deaths in cities during

	Antitoxin times.		Before antitoxin times.	
	Per year.	Deaths.	Per year.	Deaths.
Trieste	1895	271	1888–90	100
London	1895–97	2,533	1886–95	2,047
Brooklyn	1895–98	1,126	1882–85	486
St. Petersburg	1895–97	1,276	1892–94	579

The deaths from diphtheria in St. Petersburg numbered 333 in 1892 and 378 in 1893. In 1896 the number of deaths from this disease was 1,118, and in 1897, 1,905. Yet, in the summer of 1897, despite these disappointing figures, Baginsky, with assurance unwarranted even by his own experience, told an American physician that he had no more dread of diphtheria since he was using antitoxin than he would have had years ago of "any simple ordinary constipation."

It is a common assumption that the mortality from diphtheria used to be 40 per cent before antitoxin times, which is as absurd as it is untrue. Certainly at times 40 per cent of the patients died. The mortality was very much higher than 40 per cent in some epidemics. Ferrand in 1827[1] related that in an epidemic all of the 60 patients died. Bretonneau in 1826 quoted Carnevale as saying that in Chiaja, near Naples, the greater part of those attacked succumbed. Ozonam's summing up of 39 epidemics from 1559 to 1805 showed 80 per cent mortality. Then the table of epidemics from 1805 to 1830, made by the Académie Royale de Médecine, gives the death rate as 25 per cent. But Beauquin in 1828[2] lost only 4.6 per cent of 300 cases. Daviot[3] had only 8.6 per cent mortality in 461 cases. Roll, in 1850[4], said that in Drontheim, Norway, of some 700 cases only about 7 per cent died. Lespeau, in 1854[5], wrote that, in one regiment, of 200 cases, only 6 per cent were lost. And Mackinder[6] reported in 1859 a death rate of only 0.25 per cent in 400 cases in Gainsborough, England. Were this great disparity in the diphtheria death rate before antitoxin times kept in mind, perhaps we would not so often be treated to the amusing argument that because the death rate has declined a few degrees in some places since antitoxin has been introduced, therefore antitoxin is responsible for the improvement. In London, for instance, some enthusiasts waxed eloquent over the new preparation, and gave Lennox Browne[7] the opportunity to prove that the decline in fatality in the London asylums

[1] Thèse de Paris, No. 234.
[2] Ann. de la Méd. Physiol., t. xiii.
[3] Work of Diphtheria, Autun, 1845.
[4] Oppenheimer Zeitsch., Bd. xlv.
[5] "Recueil de Memoires Méd.," etc., t. xiii.
[6] Medical Times and Gazette, v. xxxix.
[7] Medical Press and Circular, 1897.

board hospitals for two antitoxin years was only about 2 per cent from what it was in 1894.

Another unjust way of reasoning is to compare the results in a few cases treated with antitoxin in a short space of time with a very much greater number of cases treated without antitoxin during a considerably longer period. Gray[1] has adopted this argument. He reports 9,851 cases treated in German hospitals from April, 1895, to March, 1896, with 15.5 per cent mortality. Then he states that from 1883 to 1894, 157,721 cases were treated in these same hospitals without antitoxin, with 26.7 per cent mortality. From this he gravely infers that the death rate has been reduced from 26 per cent to 15 per cent on an average in ordinary cases. No account is taken of the fact that during the years 1883 to 1894 all the cases, good and bad, were included, while during the antitoxin months, from April to March, the statistics were generally based on selected cases. And he compares the result in 9,851 cases treated during eleven months, with 157,721 cases coming under treatment during eleven years. It is a fact open to anyone making a close examination of the reports of cases treated with antitoxin soon after the use of that article was introduced, that always only some cases selected for one reason or another were treated with serum, while another set of cases did not receive it. The moribund cases were generally put in the latter class. This is true of the very first report presented by Baginsky to the Berlin Medical Society.[2] It is there stated that 23 cases were not treated with serum. In the first series treated by attending physicians with free antitoxin[3] from the New York City health board some were not even bacteriologically diagnosed, and the whole number of cases, 375, on which the statistics were founded was obtained by omitting 34 cases on account of imperfect data. The same thing holds true, and to a much greater extent, of the statistics of the London asylums board hospitals.

How can a thing be considered a specific which gives 11.8 per cent mortality in the Berlin Kaiser und Kaiserin Friedrich Kinderkrankenhaus, and at the same time allows a mortality of 23 per cent in the Philadelphia Municipal Hospital, being more than double the mortality in one institution than in the other? Quinine would not be called a specific if it could not cure intermittent fever as well in Chicago as it does in St. Petersburg or any other city. Until antitoxin brings down the diphtheria death rate to a point lower than it ever was before, and keeps it at that point in every place, it must be considered a failure.

In August, 1896, the death rate in the Philadelphia Municipal Hospital was 22.2 per cent; in September it was 41.6 per cent. Had the use of antitoxin been stopped in September, when the mortality was again as high as it was in the previous month, antitoxin advocates would have had another opportunity to point out the surpassing excellence of the serum treatment. This again illustrates that antitoxin has no influence on diphtheria; the difference in the results in different hospitals is always due to the difference in the character as regards malignancy in the cases treated. When in Berlin the supply of antitoxin gave out, and the mortality at once went up, it was only a coincidence. Many an innocent man has been wrongfully executed on more convincing circumstantial evidence than this, and it ill becomes a reasoning profession to be convinced by such testimony without taking all the other facts in the case into earnest consideration.

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[1] Jour. of the Amer. Med. Assoc., November 27, 1897.
[2] Berliner klin. Woch., July 16. 1894.
[3] Medical News, December, 1896.

Within the writer's knowledge diphtheria occurred in the families of four physicians in this city. Of the patients two received antitoxin and promptly died. The other two were not treated with antitoxin and recovered. It is fair to assume that the antitoxin-treated cases, being in doctors' families, were not neglected, and that treatment was begun early in the disease.

In the following table will be found the mortality of cases of diphtheria in general treated with and without antitoxin:

Mortality of diphtheria cases treated.

WITH ANTITOXIN.

J. Lewis Smith, under 2 years, 31 cases[1]	54.0
London Asylums Hospitals, 1896, under 5 years[2]	32.2
Baginsky, 1,324 cases up to July, 1897[3]	11.8
London Asylums Hospitals, 1895[4]	28.1
Philadelphia Municipal Hospital, 1898[5]	23.0
City of Philadelphia, 1898[5]	26.0
Russia[6]	14.6
Dorning, 7 successive deaths[7]	100.0
Dallas, 11 cases[7]	90.9
Ewing, 50 cases[8]	38.0
Von Engel, 39 cases[9]	25.5
American Pedriatic Society's Report[10]	12.3
Hôpital d'Enfants, Paris, 300 cases[11]	26.0
London University College Hospital[12]	28.0
Brooklyn, Richmond, and Queens, 1898[13]	23.7
Berlin Am. Urban Hospital, 245 cases[14]	28.0

WITHOUT ANTITOXIN.

Ernst, under 2 years, 32 cases[15]	12.5
Daviot, epidemic, 1841–1844, under 5 years[16]	4.7
Hennig, 1,927 cases during 18 years[17]	3.0
Huebner, Leipzig Children's Polyclinic for 15 years[18]	22.5
Willard Parker Hospital, 1889[19]	20.6
Table of Epidemics, 1805–1830[20]	25.0
Basel, 17 years[21]	12.6
Welch, Girard College, 116 cases[22]	0.0
Braymer, 32 cases[23]	0.0
Ernst, 65 cases[24]	16.9
Bieser, 115 cases[25]	5.0
Forsland, during 20 years[26]	5.0
Beauquin, 300 cases[27]	4.6
Basel, Children's Hospital, 1886[28]	6.2
Escherich[29]	8.3
Neuman, from 1894 to 1898, 183 cases[30]	1.6

References for above table.—[1] New York Medical Journal, Winters, February, 15, 1896. [2] Medical Press and Circular, No. 3030, Browne, 1897. [3] Arch. für Kinderheilkunde, Bd. xxiv, H. 5, 6. [4] Report for 1895. [5] Philadelphia Health Report for 1898. [6] Figures by Rauchfuss. [7] Journal American Medical Association, Coughlin, November 27, 1897. [8] New York Medical Journal, August, 1895. [9] New York Medical News, Biggs and Guerard, December, 1895. [10] New York Medical Journal, July 4, 1896. [11] New York Medical News, December, 1895. [12] British Medical Journal, January 25, 1896. [13] Biggs, Philadelphia Medical Journal, February 25, 1899. [14] Medical Record, April 18, 1896. [15] Medical Record, June 20, 1896. [16] Work on Diphtheria, Autun, 1845. [17] Verhand des Cong. für innere Med., 1896. [18] "Behandlung der Diph.," Leipzig, 1895. [19] Report for 1889. [20] Prepared by Académie Royale de Médecine. [21] Medical Record, February 15, 1896. [22] Medical Record, January 28, 1899. [23] Journal American Medical Association, November 27, 1897. [24] Medical Record, June 20, 1896. [25] Medical Record, November 20, 1897. [26] Eira, No. 8, 1898. [27] Annales de la Méd. Physiologie, t. xiii. [28] Annales Suisses, 1894. [29] "La Serumtherapie," Vallette, Geneva, 1895. [30] Therapeutische Monatshefte, February, 1899.

Another stereotyped statement is that the mortality for operative diphtheria cases used to be 73 per cent before antitoxin was used. Again it must be pointed out that this is not the whole truth. And it is especially absurd to claim, as has so often been done, that now under antitoxin treatment only 27 per cent of operative cases die.

The first successful tracheotomy for croup was performed by André, of London, in 1782. From that year there was no other successful case reported until Bretonneau saved another patient in 1825, after having failed in many previous attempts. Altogether Bretonneau lost 14 out of 20 tracheotomy cases—70 per cent. Trousseau[1] lost 42 out of 65 cases, also 70 per cent. Bochut lost 115 out of 160 cases, or 72 per cent. He says the mortality in 198 cases up to 1852 was 72 per cent. But already before that year Pètel had saved 3 out of 6 cases, or 50 per cent. This was experimental work with a new operation—an operation associated with the greatest imaginable horror in the minds of parents. In those days tracheotomy had to be done without anæsthesia, a reason why it was then even more difficult than now to obtain permission to operate. The modern trained nurse was as yet an unknown factor. As Guersant well said: "Tracheotomy did not usually succeed in croup because no precautions were afterwards taken to insure its advantages. The mere performance of the operation does not alone constitute the cure." Probably no one will dispute that no operation requires such persistent intelligent after-treatment; and it is here that the trained nurse contributes an inestimable aid to the physician. Much has since been learned about tracheotomy. Besides better nursing we have improved tubes to keep the respiration free, an enlightened understanding of the value of asepsis, and anæsthesia; and we have learned through accumulated experience how properly to perform the operation. Why shouldn't we get better results now than fifty years ago? The answer is, we do get better results—and we get them without antitoxin. Intubation gives better figures than tracheotomy if not better actual results, because more patients will consent to intubation. In Basel tracheotomy mortality has been as low as 59 per cent in 333 cases. The Philadelphia Children's Hospital has had 57 per cent mortality. In Geneva, from 1872 to 1888, the mortality was 49 per cent. The death rate of tracheotomy cases in the London University College Hospital in 1894 was 47 per cent. In Strasburg, from 1891 to 1894, the tracheotomy mortality was 44 per cent. The mortality in other places has been even lower than the above-quoted rates, as shown in the following table:

Operative mortality rate.

WITH ANTITOXIN.

Willard Parker Hospital, intubation, 9 months, 1995 [1]	68.0
Baginsky, 14 primary tracheotomies [2]	71.4
Willard Parker Hospital, 6 months, 1897 [3]	82.8
New York Health Department, intubation [4]	36.0
Philadelphia Municipal Hospital, 1897 [5]	68.8
Cassell, tracheotomy [6]	61.0
American Pediatric Society's First Report [7]	27.2
American Pediatric Society's Second Report [8]	25.9
Boston City Hospital, 1895–96, intubation [9]	53.0
Willard Parker Hospital, 3 months, 1895 [10]	76.9
London Northwestern Hospital, 1896 [10]	63.1
Baginsky, Berlin [11]	32.3
London Asylums Hospitals, 1895 [12]	50.0

[1] "Dictionnaire de Médecine," 1835.

WITHOUT ANTITOXIN.

Dower, Brooklyn, 67 tracheotomies [13]	25.3
Soerensen, 13 tracheotomies [14]	7.6
Willard Parker Hospital, 1892 [15]	62.2
Bieser, intubation [16]	27.0
Strassburg Hospital, 1891 [17]	25.0
Cohen, tracheotomy [18]	33.7
Ernst [19]	22.2
Seymour [20]	14.2
Drobrink, tracheotomy [21]	37.0
Zurich [22]	29.0
Strasburg, 1891–1894 [23]	44.3
Soerensen, Copenhagen [24]	25.0
Sonnenburg [25]	37.1

References for above table.—[1] Medical Record, January 20, 1896. [2] Arch. für Kinderheilkunde, B. xxiv, H. 5, 6. [3] Meeting of the New York Academy of Medicine, 1898. [4] Report up to January 1, 1899. [5] Health Board Report, 1897. [6] New York Medical Journal, February 15, 1896. [7] New York Medical Journal, July 4, 1896. [8] Medical Record, 1897. [9] Health Report. [10] Medical Record, January 20, 1896. [11] Kaiser und Kaiserin Friedrich Joseph Kinderkrankenhaus. [12] Report for 1895. [13] Written communication. [14] Kassowitz. [15] Reported to Drs. McNaughton and Maddren by resident physician Dr. F. W. Lester. [16] Medical Record, November 20, 1897. [17] Verhand. des Cong. f. Innere Med., Kohts, 1895. [18] Wood's "Reference Handbook of the Medical Sciences," vol. ii. [19] New York Medical Journal, February 15, 1896. [20] Medical and Surgical Bulletin, March 21, 1896. [21] Journal American Medical Association, November 27, 1897. [22] During 1884. [23] Therapeutische Monatshefte, Siegert, March, 1895. [24] During 1895. [25] "Serumtherapie," Schurmayer, Leipzig, 1895.

II. Diphtheria exerts its harmful effects especially through sepsis, paralysis of the heart and other organs, impairment of the function of the kidneys, and the mechanical presence of an abnormal formation known as the false membrane. On none of these does antitoxin act beneficially. It is not asserted that it neutralizes the toxin already in the system, but only that it prevents the production of more toxin after the antitoxin has been injected. On the other hand, it has been demonstrated that antitoxin acts injuriously by causing paralysis of the heart and other portions of the body, on the kidneys, on the skin and the joints, and that it causes septic pneumonia, etc.

It has no effect whatever on septic diphtheria. Winters[1] has declared "in not a single septic case has the antitoxin made the least impression." Chapin[2] says the "so-called septic type is usually followed to a fatal termination by a persistent and powerfully depressant action upon the heart." All the septic cases included in the first report by Baginsky were fatal.[3]

Concerning the effect of antitoxin on the heart Baginsky reported: "Heart symptoms, certainly systolic murmurs, were more frequent." He admits that some die of heart failure, even when treatment is begun early. Korte[4] speaks of 40 early-treated cases, of which 19 were fatal by heart paralysis. A few years ago a member reported to the Brooklyn Pathological Society that he had lost from heart failure a case of diphtheria treated without antitoxin. When a second child in this family developed the disease, the physician at once commenced antitoxin treatment. While the second patient was convalescing, a third child in the same family became sick and was also treated with antitoxin. Both the second and the third child eventually died of paralysis of the heart. Is any comment necessary? Berlin[5] says post-

[1] Medical Record, April 20, 1895.
[2] Medical Record, January 15, 1898.
[3] Berliner klin. Woch., July 16, 1894.
[4] "Serumbehandlung der Diphth.," Wien, 1895.
[5] Münchner med. Woch., No. 42, 1897.

diphtheritic paralysis is without doubt more frequent. Goodall[1] finds that in the London metropolitan asylums board hospitals diphtheritic paralysis has been rather more frequent since antitoxin has been used. In 1894 paralysis developed in 13.2 per cent and in 1895 in 23.2 per cent of cases.

Of the effect of antitoxin on the kidneys Bieser[2] "soon learned that the patients developed acute suppression of the urine after the antitoxin was injected." In the London hospitals the proportion of albuminuric cases was greater in 1896 than in 1894. Soerensen[3] "observed more albuminuria, nephritis, toxic anuria, etc., in those treated with serum." Lennox Browne records 6 deaths from inflammation of the kidneys in 8 cases of diphtheria treated with antitoxin. Benda mentions 39 fatal cases, of which 33 had nephritis. Soltman[4] found albumin in 72 per cent after antitoxin which did not show it before injection, and compares this with the record of 24 per cent in 1894. Ewing[5] showed that antitoxin caused changes in the leucocytes and diminished the number of red corpuscles. Another investigator proved that the injection of plain horse serum is harmful. Chapin injected it into children suffering from marasmus, and all the cases did badly. He then injected the serum into guinea pigs and a large sheep, and found the kidneys of these animals after the experiment to be the seat of cloudy swelling. Using streptococcic serum on dogs and rabbits, Thomson[6] found that 20 c. c. caused a fall of blood pressure in the kidneys. After the injection of 40 c. c. there were hæmaturia and hæmoglobinuria preceded by albuminuria and followed by suppression of the urine. Small divided doses were followed by albuminuria.

There is no convincing evidence that antitoxin exerts any influence on the false membrane in causing its early detachment or disappearance, or in preventing it from spreading. Even if it did, it would not signify much, for the membrane is simply the effect of something; it is not the disease. Patients often die after the membrane has disappeared. The diphtheritic lesion is identical anatomically with croupous inflammation due to traumatic and other causes.[7] Back of the formation of the false membrane is that deranged condition of the system permitting the growth of pernicious bacteria, which abnormal state is really the disease. We do not know but what the formation of the false membrane is nature's method of protecting the patient; and until it shuts off the air from the lungs the membrane may serve some useful purpose. Rupp[8] couldn't see any effect on the membrane in his 24 antitoxin-healed cases, "in such a way as to be beyond doubt."

It is a common thing, in cases not treated with antitoxin, for the membrane to begin to fall off after the first day, and completely to disappear in three or four days. Rupp needed to visit two cases which were not treated with antitoxin only four days, and one, a croupal case, only three days. The diagnosis in each case was confirmed by bacteriological examination. Bretonneau, in his classical work on diphtheria, distinctly taught: "You will remark that at the first day of the appearance * * * a radical cure may be obtained in forty-eight hours." Yet antitoxin advocates claim everything, because in some cases treated with antitoxin the false membrane begins to disappear, as they say,

[1] British Medical Journal, February 4, 1899.
[2] Medical Record, November 20, 1897.
[3] Therapeutische Monatshefte, March, 1896.
[4] Therapeutische Monatshefte, February, 1896.
[5] Medical Journal, August, 1896.
[6] Archives of Pediatrics, August, 1898.
[7] Delafield and Pruden. "Pathological Anatomy," 1895.
[8] *Medical Record*, January 28, 1899.

early; in two or three days (Wiemer), or three or four days (Baginsky). This also happens earlier and later. In fact, with antitoxin it is often very much later. Chapin[1] speaks of a seven-year-old patient receiving 4,500 units on the third day, with the result that the throat cleared only after six days, and later the membrane partly reformed. Winters[2] saw it remain ten days in two cases, and in another at the end of the twenty-second day it was still present.

It is conceded that eruptions are often caused by the injection of antitoxin. Engelman[3] and Morse[4] describe cases of urticaria. Meyer[5] saw urticarial rash in one case, and a macular eruption in another. Berg[6] in summing up his observations concludes: "In very many cases the eruption, if at all general, is at least a discomfort." In others a "decided increase in the gravity of the disease accompanies the appearance of the eruption," which is present in "at least 10 per cent of cases treated with antitoxin." Martin and Hunt[7] saw the eruption in 27.5 per cent of 178 antitoxin-treated cases. The London Asylums Hospital Report for 1896 says the eruption appeared in 35.2 per cent of the cases treated with antitoxin.

Joint troubles also follow the use of antitoxin. Lombard[8] had one case in which there was pain in the joints. Fleisch[9] describes a case in which swelling of the hip joint occurred. Perregeaux[10] mentions 30 cases of joint trouble following the use of antitoxin.

Before antitoxin was used in the Willard Parker Hospital 16 per cent of the fatal cases died of pneumonia. During nine months of 1895, 53 per cent of the deaths were caused by this disease. Winters[11] thought "the enormous increase of pneumonia has no other explanation than the hypodermic injection of serum."

Finally we have the startling fact that the injection of antitoxin for the purpose of immunization has killed many people. Korach[12] and Alfoldi[13] and many others have reported deaths following prophylactic doses of antitoxin.

In 1895 Dr. Cordeiro concluded his report on diphtheria antitoxin to the surgeon-general of the Navy with these words: "As yet we have not the slightest basis on which to found an expectation that fewer children will die in the future of this disease on account of the serum treatment;" and every year adds fresh testimony confirming the justness of this decision. The cases which are now lost when treated without antitoxin, the septic cases, the bad kidney cases, the paralytic cases, and the stenotic cases, are just the ones which it has been shown can not be cured with antitoxin. And from all the bad effects, pointed out above, caused by the use of antitoxin, it follows that many lives have been sacrificed which might have been saved with the usual time-honored remedies.

1098 BUSHWICK AVENUE.

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[1] Medical Record, January 15, 1898.
[2] Medical Record, April 20, 1895.
[3] Medical News, January 1, 1898.
[4] Boston Medical and Surgical Journal, February 17, 1898.
[5] Deutsches Archiv für klin. Med., p. 145.
[6] Medical Record, June 18, 1898.
[7] British Medical Journal, September 3, 1898.
[8] Ann. des Malad. de l'Oreille, du Larynx, etc., November, 1897.
[9] Berliner klinische Wochenschrift, January 31, 1898.
[10] Jour. des Prat., No. 8, 1895.
[11] New York Medical Journal, February 15, 1896.
[12] Therapeutische Monatshefte, February, 1896.
[13] *Pester* med. Presse, No. 10, 1895.

Dr. KEEN. I will now introduce Dr. Henry P. Bowditch, professor of physiology in Harvard University.

STATEMENT OF DR. HENRY P. BOWDITCH, PROFESSOR OF PHYSIOLOGY IN HARVARD UNIVERSITY.

Dr. BOWDITCH. Mr. Chairman and gentlemen of the committee, it is a part of the price that we have to pay for our free institutions that we must at all times be ready to defend the things we most cherish. "Eternal vigilance is the price of liberty," and the saying seems to be as true of liberty to study and investigate as of the political liberty with regard to which the saying originated.

At various times within the last quarter of a century have the efforts of misguided benevolence been directed to checking the progress of medicine by interfering with one of the most important methods by which advances can be made.

Fortunately for humanity, these efforts have, in nearly all cases, been rendered futile by the sound common sense of the community.

In England alone, of all civilized countries, has a certain measure of success crowned the efforts of fanatical agitators, and by a restrictive law a serious blow has been inflicted upon physiology.

I have used the words "misguided benevolence" in speaking of this agitation, and there is no doubt that the movement appeals to some of our noblest feelings, to the sentiment that bids us be merciful as we would obtain mercy. It is freely admitted that a large number (but unfortunately not all) of the persons engaged in this crusade are benevolent in their dispositions and conscientious in their attitudes; but it should be remembered that, as Governor Roosevelt once remarked, "Conscience without common sense leads to folly, which is but the handmaiden of crime."

In the limited time which is at my disposal it is impossible to do more than call the attention of the committee to one or two points.

In the first place, the real object of all this agitation is the total abolition of vivisection. The chairman of the committee has called attention to the fact, and other speakers have done the same, that this is not a proposition to abolish vivisection, but to restrict it. I wish I could believe that the matter could end there. Unfortunately, the history of this movement shows that there is something very different in view. The movement to restrict vivisection will certainly be followed by a movement to abolish it. This is not merely a surmise of my own. It is borne out by the literature on the subject. In order to prove this, let me read to you just one paragraph from one of the recognized organs of the antivivisection association, namely, the journal known as Anti-vivisection:

> The restrictive act in England, after a trial of nineteen years, has failed to restrict—according to official returns. There is no reason to doubt it would be the same in America. The eighty-four societies of the world are demanding total abolition.

Now, Mr. Chairman, that is what this movement means. Those who are here now demanding restriction will be here in a few years demanding total abolition.

What that means I am in a position to prove to you, from the words of another antivivisectionist. It means that scientific men will be prevented from making scientific research in laboratories, and that others will be prevented from making use of these data of science.

This may seem extravagant, and I dare say that many people here

think this statement can not be sustained, but I wish to read what Henry Bergh wrote. He has been dead now some years. While he lived he was the recognized leader of the antivivisectionists. He was the president of the New York Society for the Prevention of Cruelty to Animals, and was always prominent in antivivisection legislation. In writing as to transfusion of blood, these were his words:

> As another proof of the profane extremes to which these dissectors of living animals go, Robert McDonald, M. D., on being questioned, declared that he had opened the veins of a *dying person*, remember, and had injected the blood of an animal into them many times, and had met with brilliant success.
>
> In other words, this potentate has discovered the means of thwarting the decrees of Providence, where a person was dying, and snatching away from its Maker a soul which He had called away from earth. (Henry Bergh: Vivisection, New York, 1880.)

I think this blasphemous denunciation of a provision for saving a human life needs absolutely no words of comment from me.

This is what the movement means, and if successful it means the plunging of medical science into a darkness worse than medieval.

Another important point to be borne in mind in this connection is the statement so frequently made in antivivisection literature that the work of physiologists is done behind closed doors. One of the gentlemen prominent in this work and who is to make the closing argument this afternoon has written a pamphlet entitled, "Does Science need Secrecy?" He maintains that experimental physiology is practiced in secret and that it is impossible to know what goes on behind the doors of a laboratory.

That statement I wish to combat. The secrecy of vivisection is like the secrecy of a surgeon. No surgeon does his work before everybody, simply because it could not be so done. The secrecy that the physiologist requires is the same. He is engaged in work of the most technical character, and to imagine that it can be done in the midst of a crowd of people who are merely looking on from curiosity to see the performance is absurd. I can not, of course, speak for all the laboratories in the world. But being in charge of one of the largest laboratories in the country I can say that no suitable person has ever been refused admission. The agents of the Society for the Prevention of Cruelty to Animals, in Massachusetts, have been in my laboratory a number of times. The president of the society, Mr. Angell, has been there, the directors and agents have been there and have seen what has gone on, and they have expressed themselves as perfectly satisfied with what they have seen and as convinced that all possible precautions have been employed to save the animals from suffering.

If the author of the pamphlet to which I have alluded ever made any application to the Harvard medical school laboratory he would never have been refused. The claim that this work is done in secret is therefore absolutely unfounded in fact. I wish I could, in the few minutes left to me present a correct impression of what vivisection actually means, because the members of the committee and of the community get no idea from the writings of the antivivisectionists. The statements made are so misleading that no truthful idea can be obtained from them. It is not the cutting, tearing, freezing, boiling process that is so frequently described. Nothing can give a more incorrect impression than such a description. In general, it may be said that the work of the physiological laboratory is as painless as possible. Anæsthetics are used freely. The bill for ether in the Harvard medical school every year is very large. I am sorry I have not the figures with me to show what they are.

In all vivisection work where any severe pain is likely to be inflicted ether is used. In some cases, however, the pain is likely to be so slight that the suffering caused by the operation is less than that occasioned by giving an anæsthetic. A human being taking an anæsthetic knows what he is taking it for. The animal does not understand why he is required to take it, and he struggles against it, and has to be confined, so that the struggles of the animal produce an amount of pain and inconvenience from which the human being is exempt. Only in cases where the pain is to be prolonged is it worth while to administer anæsthetics. It is not necessary in cases where merely a slight cutting is to be made into the skin.

There is, of course, a class of cases occasioning more or less suffering, in which it is impossible to use an anæsthetic—that class of cases already alluded to where the use of the anæsthetic would be inconsistent with the object of the experiment To give ether while studying a drug inconsistent with it would not be of any use or benefit. Those cases are very few. Their number is not worth taking into consideration. In other words, so far as I can understand the matter, there are in the laboratories of the country no abuses to be corrected. There are, furthermore, no unauthorized vivisection practices performed by medical students or others, at least so far as I know. I only know of one private physiological laboratory in the country; that is in Easton, Pa., and that, I am told, is now closed. Of course I can not say that that there are no physiological experiments carried on by individuals in their own homes, but I think they must be very few, in Massachusetts at any rate; for I think I should have heard of them, as I am in a position to know better than anybody else what private vivisection is doing; I should see the results published or, if nothing were published, the men engaged in them would be likely to come to the laboratory for information or help.

If then I, a professor of physiology, can conscientiously say that I know of no private vivisection going on in the State, how is it likely that the persons who would have this law in charge would find it out?

I am supposed to be in relation with people who would be doing it. I think it could be safely said, then, that the vivisection which would be prevented, hindered, or hampered by the existing law would not be that of private individuals, for they can not be found out, but it would be the vivisection of Government employees and those working in schools. In other words, the bill now before us will reach just the men whom it is no object to reach, and it will fail to reach the men who ought to be discovered. Private individuals can not be discovered.

Senator GALLINGER. With regard to the Harvard Medical School, let me ask you a question. You have had differences of opinion in that school in regard to vivisection, have you not? I allude to the position of Dr. Henry J. Bigelow.

Dr. BOWDITCH. He did object to vivisection, but, Mr. Chairman, he knew nothing about modern physiological research. He had derived his impressions from what he had seen in the French veterinary school at Alfort forty years before. To show that he never had any objection to the modern physiological research it is sufficient to mention the fact that he was the leading member of the medical faculty when the physiological laboratory of Harvard was established. If he had wanted to stop it he could have done it, as he was the leading professor in that school.

Dr. Keen introduced Dr. Mary Putnam Jacobi, of New York, who said:

STATEMENT OF DR. MARY PUTNAM JACOBI, OF NEW YORK.

MR. CHAIRMAN AND GENTLEMEN: I have not come here to join in any elaborate argument on the vast number of details which might be involved in connection with this bill. For their adequate discussion a hearing of many days would hardly suffice, and there are those present who are more competent to discuss them than I. I will only speak to one point, to what strikes me as the fundamental vice of the bill. This is that all its provisions are deliberately planned for the domination of knowledge by ignorance.

How great this ignorance is appears abundantly in the so-called anti-vivisection literature.

Merely to illustrate:

I knew a prominent agitator on this subject, who related, with horror, the description of an experiment about which he had read, where, in a profoundly narcotized animal, thermometers were passed down the carotid artery and jugular vein in order to ascertain the comparative temperature of the two sides of the heart. This was found to be 2 degrees, and "for this trifling result," exclaimed the philanthropist, "must such a horrible experiment be performed." How could he estimate the value of that result? No mention was made of the anesthesia by which the dog was conducted to death through a true euthanasia. This same gentleman did not know the difference between a pig and a guinea pig, and begged earnestly that pigs should not be operated upon in laboratories, which, in fact, is hardly ever done.

Dr. Leffingwell, whose statements seem to have been much relied upon by the author of this bill, makes statements as wide of the mark. He refers to experiments made in 1823 by Magendie, and in 1842 by Longet, as on the same plane with those habitual since the introduction of anesthesia. He does not seem to know as much about the dormitive powers of opium as did the doctors of Molière, and severely condemns Dr. Beyer for an experiment on artificial respiration because morphine was employed instead of ether or chloroform.

In this sweeping protest against the infliction of pain, the agitators make no difference between the sensibilities of different classes of animals. They do not know that a rabbit will continue to contentedly munch a carrot at the very moment that an operator is cutting his sciatic nerve. They do not know that after section of a nerve or the spinal cord no pain can be felt; they make no difference between a momentary and a prolonged pain; they do not notice that the sensory functions of the posterior spinal roots have been demonstrated by manipulations strictly analogous to those of the dentist who touches the exposed nerve of a tooth; therefore they do not know that the most painful step in most operations is the incision of the skin; they do not know that during visceral manipulations the animal is plunged into a stupor which often renders anesthesia superfluous. In a word, they have no practical acquaintance with a million of facts that it is necessary to know if they want to talk about them, and they misinterpret the facts that actually appear under their eyes. I remember being severely denounced myself because during some weeks I administered cod-liver oil to a kitten.

Dr. Leffingwell is so determined to show that physiological experi*mentation* is of no use that he quotes, as if they were gospel truths,

the discredited diatribes of Dr. Winters upon antitoxin; and like all others of his party he makes a great deal of Lawton Tait's denunciation of experiment. He omits to note that Tait was equally vehement in his denunciation of antiseptics, and while objecting to operations on frogs and rabbits, he devoted his life to the vivisection of women.

But one of the queerest things in Dr. Leffingwell's paper was his comment on the recent brilliant achievements of Pasteur and Horsley, in their discovery of the cause and of the cure of hydrophobia and of myxedema. Of these, Dr. Leffingwell observes that hydrophobia is a very rare disease, and that myxedema is so rare that it is not even mentioned in most medical text-books.

The first inference from this remark must be that there are several modern text-books which Dr. Leffingwell has not read; but this is not all; it shows absolute lack of comprehension of the extreme intellectual value of the exquisite line of reasoning and experimentation which the great English surgeon so successfully brought to bear upon a mysterious and hitherto incurable disease. The influence of this demonstration in opening new horizons of thought, and thus in helping forward the arduous struggle for truth, is incalculable, and will outlast the lives of all the patients whose lives have been saved by Horsley's discovery. If Dr. Leffingwell cares so much for a single dog, how can he be indifferent to the life of even a single myxedemic being?

The bill under discussion reflects all the inadequacies of comprehension inevitable in the lay population with whom it originated. In its original provision about "vertebrate animals" it is evident either that frogs and fishes are supposed not to be vertebrates, or else that conditions of sensibility are attributed to them which are only true of warm-blooded animals. Indeed, it looks as if the distinction between vertebrate and invertebrate had been unconsciously confounded with the distinction between cold and warm blooded.

The arbitrary decisions about the purposes for which alone experiment is to be permitted, under what circumstances anesthesia is to be employed, at what age students of physiology may have a right to obtain a license, are so many indications that the authors of the bill had no acquaintance with the study of physiological science, but without such acquaintance how is it conceivable that they should have the ability to draw a bill in regard to the technique of such science? And if they can not have the ability simply because they have never made such matters their business, where is the justice or the common sense in intrusting them with the power?

What is the use of talking about Brown Sequard, who is dead, about Brazil, which is a good way off, when you are asked to consider the handful of physiologists in the District of Columbia? What is more dangerous, more demagogic, more frightfully unjust than power to interfere with the interests of other people, when there is only hearsay knowledge about these interests and an avowed practical antagonism to them?

The choice of the persons who are to carry out the "regulating" provisions of the bill reflect all this dangerously demagogic inversion of the proper relation of knowledge and ignorance. Supervision of the most difficult and delicate technique in the whole range of science is to be intrusted to the Commissioners of the District of Columbia. And the President of the United States is to appoint lay inspectors, to see that scientific men do not do anything that they ought not to do.

We have repudiated the right of the church to control the procedures and conclusions of science. Why should we now make over this

right to men immersed in business and politics? Are they any more fitted than priests? Has not the supreme Government of the United States more urgent problems to discuss than the fate of cats and rabbits? Must it turn aside from the work it is fitted to do to meddle with the work for which it is radically, necessarily, intrinsically unfit?

You would not ask an association of plumbers to submit itself to the dictation of a syndicate of grocers, for the reason that the two trades are too far apart. You would no more ask a college of chemists to decipher Assyrian inscriptions than you would ask so many Russian peasants to do the same thing. In every other sphere the people who are allowed to lay down rules are supposed to know more and not less than those to be governed by them. Why should this universal rule be suspended in the case of physiologists—a class at present numerically so small that its members in any community can easily be counted on the fingers?

It is said that the preponderating mass of antagonism to physiological experiment comes from women, and this in proportion to their remoteness from any practical responsibilities in regard either to the science of life or to the treatment of disease. It is my own conviction that the readiness on the part of women to plunge into active meddling with what they know nothing about, is one of the consequences of the privation of political rights, which forcibly expresses their instincts for public activities. Once in possession of a legitimate field for such activities, these same women would learn to exercise them about such subjects as the average citizen can really know about, and would cease these excited crusades on matters about which only very few can, or care to, know. To people who are not fully occupied there is an immense charm in the prospect of interfering with somebody else, but there is no reason why, on any specious pretext, the Government of the United States should be involved to gratify this particular and widespread taste.

Whatever can be done to diminish or demolish suffering in connection with physiological experiment must be done by competent physiologists, exactly as the suffering of surgical operations is constantly being lessened by the efforts of surgeons. The immense difficulties of experiments is enormously underrated when it is supposed that people so fundamentally lazy as are quacks and charlatans ever trouble themselves to engage in it, or that simple public school teachers ever could do so. I believe the rumor of such experiment is based entirely upon the dissection of dead animals.

It is as legitimate for the outside world to demand the avoidance of all avoidable pain in laboratories as it is to demand that soldiers sent to fight should not, if possible, be allowed to become infected with typhoid fever; but it would be absurd to demand of a nation at war that none of its soldiers should ever be killed in battle. It is equally absurd to demand that the small class who, on behalf of all humanity, are engaged in strenuous warfare with misery, and with the ignorance that causes it, should be obliged to never inflict any pain. To abolish physiological experimentation on the pretext of saving a few animals imitates the famous scheme of burning down a house in order to roast a pig.

Seventy-five years ago, at the very time that the application of experiment to physiology first brought it into the ranks of the exact sciences, the celebrated anatomist Bichal declared that no intelligent man could be expected to concern himself with such a farago of nonsense as the so-called art of therapeutics then consisted in. To-day, and since it has

become possible to really study the phenomenon of life, the face of the world has been changed.

It is now proposed to turn back the hands of the clock and revert to conditions where the only resources of suffering human beings are to be looked for in a "farago of nonsense," for such could not fail to be the result if the crude and clumsy system of "regulation" by untrained officials be allowed to come into force and fatally cripple the work of those who devote themselves to the science of life. If there must be "regulation," let it be applied to Faith Curists and Christian Scientists, and an attempt be made to restrict their blind and reckless experimentation on helpless children. But I think this whole system of legal regulation and many of the arguments for it which have been advanced to-day are simply the offshoots of that mania for restrictive laws which has ever been recognized as one of the most curious characteristics of triumphant democracy.

Senator GALLINGER. How long have you been a practitioner of medicine, Dr. Jacobi?

Dr. JACOBI. Since 1872.

Senator GALLINGER. I notice that you have criticised some statements made by Dr. Leffingwell concerning hydrophobia. You have practiced medicine some twenty-seven or twenty-eight years. How many cases of true hydrophobia have you seen, as a physician?

Dr. JACOBI. I have not seen any. I did not deny that it was a rare disease. I denied the inferences drawn from that fact.

STATEMENT OF BRIG. GEN. GEORGE M. STERNBERG, SURGEON-GENERAL, UNITED STATES ARMY.

MR. CHAIRMAN AND GENTLEMEN OF THE COMMITTEE: The first speaker said something to the effect that any experiment that gives pain to an animal is cruel. I do not think that that is a correct definition of cruelty. If so, we must extend it. Then it would be cruel to hurt an animal in sport, or to trap or hunt an animal in order to obtain food, or in order to obtain his skin for clothing. If that is a true definition of cruelty, then any person desiring to obtain food by killing animals and giving pain would be guilty of cruelty.

I do not, however, think that that is a correct definition. I think that cruelty is the giving of *unnecessary* pain. If a man should deliberately maim or wound an animal when he had the opportunity of dispatching it at once he would be cruel. The experiments in our laboratories are not cruel, because unnecessary pain is not given. We are not indifferent to pain; but it is not necessary for me at present to dwell upon this or upon the methods taken to prevent pain. There are certain experiments, of course, in which pain must be inflicted. I would mention, for example, the vaccination of calves; not an experiment any more, but a business. Certainly the shaving of the belly of a calf and vaccinating it and the resulting pustules must give pain—more than would result in a large number of experiments in our laboratories. But there has been no attempt to stop that.

One great objection I have to this bill is that it is to restrict men engaged in scientific research, while allowing any amount of pain to be inflicted upon animals for profit or for sport.

For example, in the operations that farmers and others perform on male pigs, colts, and calves, for profit, there is no proposition to legislate that an anaesthetic be given in these painful operations. That is

one reason why the bill seems to me to be aimed at those engaged in scientific research.

I wish simply to take as a text for the few remarks I have to make on this bill a memorial contained in a document known as Senate Document No. 107, Fifty-sixth Congress, first session. That memorial, addressed to the Senate, was drawn up and signed by the representatives of the scientific societies of this District, including the Medical Society, gentlemen selected by those several societies to represent them in opposing the measure then before the Senate (which is now before this committee), which they considered unnecessary and mischievous.

The first point set out in that memorial is that "further legislation is unnecessary, the provisions of existing law being sufficient to entirely prevent such cruelty as is mentioned in the bill."

Then we call attention to the present law, that is, the law now in force, passed February 13, 1885. The health officer of the District has recently reviewed the subject in such manner that I do not think it necessary to dwell upon it further. The law should be known to everybody, as it was widely published.

We insist that the present law, which is general in its application, is all that is necessary.

The second point in the memorial to which I have referred is that "no cruel and unnecessary experiments upon animals are now or to our knowledge have been performed within this District."

As I have said, all the members, representing the various scientific societies in the District, signed that memorial, including that statement which I have just quoted.

To the statements made in that memorial, which, as a member of one of the societies, I signed in connection with the other gentlemen, I would add, for myself, that as Surgeon-General of the Army I have general direction of the work that is done in the laboratory of the Army Medical Museum. The experiments we make there are inoculation experiments with reference to infectious diseases—experiments of a most important character; and if the definition of cruelty, apparently adopted by the advocates of this bill, is correct—that anything that gives pain to an animal is cruel—then these experiments are cruel.

A little pain is given when a hypodermic injection is given. If this giving of pain then is cruel, we certainly are making cruel experiments. There certainly is a little pain given in making these injections, but it is not cruel if it is necessary in the interest of science.

Senator GALLINGER. This bill, you are aware, entirely excludes that class of operations, does it not?

General STERNBERG. I have not read it very carefully of late for the reason which I will state further on. I have not read the bill very carefully, because I am opposed to all such legislation whatever, as I do not think it necessary. I think it hardly worth while to allude again to the alleged cruel experiments referred to in a letter from Dr. Rauterberg. He was a hospital steward at the Army Medical Museum, and his connection with the Museum was severed in 1872. He was not considered one of those most desirable to be retained. His statement was that he had seen animals operated upon—mutilated, and put away to be brought back another day. I do not remember his exact words, but that was the substance of his statement. Others at the Museum have denied that any such experiments occurred; but I am disposed to think that there is some basis for Dr. Rauterberg's statement, and that if he would frankly tell us what animal he had seen operated upon he would tell us it was a frog.

I think it probable that Dr. Rauterberg may have seen a frog that had the brain removed—which removes all sensibility. If a frog be placed upon a table with its brain removed, it is impossible for it to feel any sensation. It neither moves nor attempts to eat, but if you touch it, as a result of reflex action it may jump away from you. Remove a leg, if you please, or any other part of that frog, and it has no more sensation than a dead frog. I judge that that is the basis of the statement, although I have been unable to get a statement as to what experiment was referred to.

I shall be very glad to leave some of my time to some other speaker.

Senator GALLINGER. You have not very much more time left, Doctor; only a minute or two.

General STERNBERG. Then I shall emphasize the last paragraph of the memorial, which says:

> Finally, we have not undertaken to criticise the provisions of the bill under consideration, because of the position maintained by us from the outset that investigation should precede legislation, and we are opposed to any legislation unless it shall first be shown by an impartial investigation that cruel experiments are being performed in the District of Columbia and that existing laws do not provide sufficient punishment for cruelty to domestic animals.

That was my position then and it is my position to-day.

Mrs. TOTTEN. As Dr. Sternberg has spoken of Dr. Rauterberg, I will say that Dr. Rauterberg told me the whole story, and that the animals were dogs.

General STERNBERG. In view of that statement, I, as Surgeon-General of the Army, ask for an investigation. We should have the opportunity of cross-examining Dr. Rauterberg. We can not accept the statement; and I do not believe it to be true. If the committee is to accept it, it should be only after a full hearing.

Senator GALLINGER. In view of the statements made by you and by Mrs. Totten, I think this committee ought to make some inquiries covering that point, and will do so.

Dr. KEEN. I ask permission of the committee to have proof sheets of this hearing before it is published.

Senator GALLINGER. I will promise that each gentleman who has addressed the committee shall have a proof sheet on one condition—that nothing substantial shall be cut out.

Dr. KEEN. That is right.

Senator GALLINGER. Complaint was made that some substantial matters were struck from the report of the former hearing.

Mrs. BARBER. I was a little interested to know, if these investigations are so very important, as our scientific friends say they are, why they do not take themselves for subjects and thus prove that they are so important. [Laughter.]

Senator GALLINGER. If those who have spoken will kindly leave their addresses with the stenographer or with the clerk of the committee, Mr. Moore, they will receive the typewritten copy of their remarks for revision.

Mr. KENNEDY. Nothing should be put into the correction that has not actually been said.

Senator GALLINGER. That is understood. Nothing should be put in and no essential matter should be eliminated.

Dr. BOWDITCH. I misunderstood the chairman, then. I understood him to say that we were to put in what we had not time to put in at this hearing.

Senator GALLINGER. Yes; anything of that kind.

STATEMENT OF DR. HOWARD A. KELLY, PROFESSOR OF GYNECOLOGY, JOHNS HOPKINS UNIVERSITY.

MR. CHAIRMAN AND GENTLEMEN OF THE COMMITTEE: I shall speak, like my predecessors, pro and con, upon the general question of the abolition of vivisection, to which end we believe this bill to be but an entering wedge—a wedge entailing at the very outset a system of espionage of one class of the community over another class.

With the name vivisection is forced upon the experimenters of to-day the odium of experiments made many years ago, even in pre-anæsthetic days, which no right-minded man would justify. We contend not for vivisection, but the right of animal experimentation, a change of name to meet conditions utterly different.

Medicine is an experimental science, and without experiment there is no progress. If experiments are not made upon animals, then they will be made upon human beings, either, first, by the observation of the slow progress of disease, or second, by the entire rising generation of surgeons in gaining that degree of technical skill which their predecessors have obtained.

The name of Lawson Tait has often been quoted in this connection, and I have read with great regret a pamphlet in which he seeks to prove that the progress which has taken place in the last ten years in serum therapy is an impossibility. Tait is a surgeon whose opinion to-day is rarely quoted and to whose dicta in this field I know no living surgeon who will not take exceptions.

I speak from a surgical experience, I believe, fully as large as Tait's when I say that experiments upon animals are necessary for young surgeons in learning to do certain difficult abdominal operations, such as intestinal resection, operation on the bile duct, etc.

In some cases of tuberculosis of the urinary organs it is impossible to make a diagnosis without injecting some of the fluids into a guinea pig and watching to see whether the animal develops a tubercular condition.

STATEMENT OF DR. WILLIAM OSLER, PROFESSOR OF CLINICAL MEDICINE, JOHNS HOPKINS UNIVERSITY.

Dr. OSLER. Mr. Chairman and gentlemen of the committee, I desire to emphasize before you the fact that the sentiment of the medical profession strongly condemns the making of experiments upon patients. The practice has been warmly denounced in many quarters.

In this pamphlet issued by the so-called American Humane Society the statement is made that this practice has not been condemned. May I read the following condemnation?

"The work of Sanarelli has been marred by a series of unjustifiable experiments upon men which should receive the unqualified condemnation of the profession. The limitations of deliberate experimentation upon human beings should be clearly defined. Voluntarily, if with full knowledge, a fellow-creature may submit to certain tests, just as a physician may experiment upon himself. Drugs, the value of which has been carefully tested in animals and are found harmless, may be tried on patients, since in this way alone may progress be made, but deliberate experiments, such as Sanarelli carried on with

cultures of known and tested virulence and which were followed by nearly fatal illnesses, are simply criminal."

That condemnation was pronounced two years ago.

Senator GALLINGER. Was that by a medical society?

Dr. OSLER. That was made by one of the medical professors in one of the leading colleges, formerly a professor of physiology and an experimental physiologist.

Senator GALLINGER. Would you have any objection to giving his name?

Dr. OSLER. I will give *you* his name, sir; I will not give it to the enemies of the profession. [Satirical laughter from some of the friends of the bill.]

So far as I can gather, in no instance quoted in the pamphlet were the experiments conducted by physiologists or by men whose education and training had any special relation to experimentation. Practical physicians, among whom I class myself, must bear the odium of this disgraceful work.

There is a great deal in this pamphlet that is simply shocking and is disgraceful. It is shocking to the sensibilities of any human being that such experiments could have been made; but I guarantee you, sir, that there is no profession in this country, from politics up [laughter], about which a precisely similar set of disgraceful statements could not be made and sown broadcast if put into the hands of this disgraceful society.

Now, sir, I use these words deliberately. I am a man accustomed to deal with my fellow-creatures. My daily walk is in a hospital. My daily contact is with human beings ill and suffering from disease; and I say, with the large bulk of the members of the medical profession the world over, that those experiments recorded here are repulsive to us, just as the deep disgrace of an offending clergyman is repulsive to the cloth at large.

One word more, sir. I have spoken warmly because I feel warmly. I feel that these people who have come here to-day should know that we physicians regard them as our bitterest enemies. The blood, sir, just surged in my veins when I heard two men who addressed you to-day say things which they should have been ashamed to say of the medical profession, of men who daily give up their lives for their fellows. There will come a time, perhaps on their death beds, when they will regret it. With reference to men who train with these enemies of the profession I say this, that I scorn them from my heart. They may know that they have the scorn of a man who has the respect of his fellow-members in the profession to which I belong.

Senator GALLINGER. I hope that nothing very violently personal may be indulged in.

I will say that when I used the name of Mantegazzi, I meant Sanarelli. If I understand it, Mantegazzi made experiments upon animals, but Sanarelli experimented with yellow fever upon human beings.

Of course we are all glad to hear the remarks of the gentleman with regard to vivisection. I will not call attention to some matters that I had noted in that connection, because Dr. Osler has denounced them vigorously. I will ask him this, however:

Supposing, Dr. Osler, that I should offer a bill preventing human vivisection, would you oppose it?

Dr. OSLER. Yes, sir; as a piece of unnecessary legislation.

STATEMENT OF DR. D. E. SALMON, CHIEF OF THE BUREAU OF ANIMAL INDUSTRY, DEPARTMENT OF AGRICULTURE.

MR. CHAIRMAN AND GENTLEMEN OF THE COMMITTEE: The opponents of this bill have not thought it necessary to employ legal counsel. They realize that there is no case so clear but that a lawyer can make a plausible argument on either side. We submit the plain language of the existing law and of the proposed bill, asking that you will consider it as you would any other piece of literature, to get at the meaning. Neither the advocates nor the opponents of this bill construe the laws. That is the function of the courts. You must judge from the language what the courts will probably hold.

The statements of the lawyers who have appeared for this bill are absolutely surprising. It was said that anyone could torture an animal in the District of Columbia, and if the claim was made that it was done as an experiment the party was beyond the reach of the law. Is that true? I ask you to consider the language of the sections which I shall read—sections 5, 6, 9, and 15 of the law now and for some years past in force in the District of Columbia.

Senator GALLINGER. I will take the personal responsibility of giving you enough additional time to read those sections, because I shall be interested in having them in the record. Then I will, of course, permit Mr. Perry, if he has other citations that he wishes to quote from the statutes, to incorporate them in his remarks.

Dr. SALMON. I now read from the compiled statutes in force in the District of Columbia, compiled by William Stone Abert and Benjamin G. Lovejoy, the quotations being from chapter 67 of that work, under the heading "Washington Humane Society," pages 540, 541, and 542:

SEC. 5. Whoever overdrives, overloads, drives when overloaded, *overworks, tortures, torments, deprives of necessary sustenance, cruelly beats, mutilates, or cruelly kills, or causes or procures* to be so overdriven, overloaded, driven when overloaded, overworked, *tortured, tormented, deprived of necessary sustenance, cruelly beaten, mutilated,* or *cruelly kills any animal,* and whoever, having the charge or custody of any animal, either as owner or otherwise, *inflicts unnecessary cruelty upon the same,* or unnecessarily fails to provide the same with proper food, drink, shelter, or protection from the weather, shall, for every such offence be punished by imprisonment in jail not exceeding one year, or by fine not exceeding two hundred and fifty dollars, or by both such fine and imprisonment.

SEC. 6. Every owner, possessor, or person having the charge or custody of any animal, who cruelly drives or works the same when unfit for labor, or cruelly abandons the same, or who carries the same, or, causes the same to be carried, in or upon any vehicle, or otherwise, in an unnecessarily cruel or inhuman manner, or knowingly and willfully authorizes or permits the same *to be subjected to unnecessary torture, suffering, or cruelty of any kind,* shall be punished for every such offence in the manner provided in section one.

SEC. 9. When complaint is made by any member of the Association for the Prevention of Cruelty to Animals, on oath or affirmation, to any magistrate authorized to issue warrants in criminal cases, that the complainant believes, and has reasonable cause to believe, that the laws in relation to cruelty to animals have been or are being violated in any particular building or place, such magistrate, if satisfied that there is reasonable cause for such belief, shall issue a search warrant, authorizing any marshal, deputy marshal, constable, police officer, or any member of the Association for the Prevention of Cruelty to Animals to search such building or place.

Dr. SALMON. Now I come to section 15. This is the section upon which so much stress was laid by Mr. Perry.

SEC. 15. Nothing in this act contained shall be construed to prohibit or interfere with any *properly conducted* scientific experiments or investigations, which experiments shall be performed only under the authority of the faculty of some regularly *incorporated medical college,* university, or scientific society.

This law applies to scientists as it does to other people. What we object to is class legislation directed at scientific men—legislation which makes certain acts cruelty whether they are or are not cruel. The law now restricts experimentation to "properly conducted scientific investigations, performed only under the authority of the faculty of some regularly incorporated medical college, university, or scientific society."

This language can not be tortured into the permission of vivisection in the public schools and by unqualified persons.

There is the same right given to search laboratories as there is to search homes for cruelty.

Mr. Perry's reference to the application of the law to the mother in the treatment of her child and not to the scientist is a misrepresentation. There is no commission to invade the homes and search the nurseries for cruelty without legal process. Neither are other professions under such specially constituted espionage. Scientists protest against a law which makes them criminals for acts which are not criminal when committed by others.

The layman has the benefit, in all prosecutions, of the general principle of law, that "to constitute cruelty the act complained of must have been done with evil intent."

This bill makes most experiments cruel and the investigator punishable, whether done with evil intent or not, whether performed by competent men or not, whether of the greatest benefit to humanity or not.

This is clearly class legislation. It is legislation applicable entirely to scientific men and not to the general public.

I have prepared a paper, which I have not time to fully read, in which I point out how this law interferes with experimentation. I shall be glad to read some of it in regard to certain diseases which have come before me as great problems—which have come before me in administering some portion of the work of the Government of the country.

Senator GALLINGER. I am sorry to say that according to the division of time it is impossible, Dr. Salmon, to give you the privilege. I am dealing generously with the opponents of the measure, not calling "time" on them. I will, however, unless the advocates of the bill object, ask permission that all of your paper may be incorporated in the proceedings.

Dr. LEFFINGWELL. I have no objection, if you will permit me to add my paper.

Senator GALLINGER. Certainly. I think the same consent should be given; I think we had better be generous about any matter that gentlemen on either side may wish to put in. So I will rule that Dr. Salmon's paper may be put in the record.

Dr. SALMON. If this bill is to pass, I hope the committee will insert a clause that its provisions may not apply to experiments ordered by the Secretary of Agriculture.

Senator GALLINGER. As a member of the committee, I shall be very glad to receive any suggestion concerning amendments. That is the first one that has been suggested. There have been severe criticisms, but no suggestion of amendment.

Dr. KEEN. I may say that Dr. Janeway has left, and Dr. Salmon may have the time that he intended to occupy.

Senator GALLINGER. Very well.

Dr. SALMON. In the arguments which have been made in favor of the proposed legislation, it appears very clear to me that the advocates of this bill admit neither the true importance and value of experiments upon animals nor the prohibitive effect of the measure which they hope to secure. Both are minimized to such an extent as to suggest the inquiry, first, as to whether the experimental method, the pride and reliance of scientific men, is after all a great fallacy; and, secondly, as to whether this proposed bill, to which the enemies of experimental research have given years of agitation and ceaseless effort, was ever intended to accomplish any practical results.

In expressing my views upon this subject, I represent first and above all the United States Department of Agriculture, which stands for the great agricultural interests of the country and which has been directed by Congress to investigate and control the diseases of animals. I represent, also, that profession which has devoted itself to the study of the diseases of animals and to the relief of animal suffering. It is twenty-eight years since I entered upon the responsible duties of my profession, and for twenty-one years of that time I have devoted all my ability and all my strength to the great pathological and sanitary questions relative to the diseases of animals which have confronted my country and my profession. Some of the incidents of that period will form the basis of my argument to-day.

THE TRICHINÆ PROBLEM.

One of the first of the great problems which it became my duty to investigate after coming to Washington was the existence of trichinæ in American pork and the danger from this parasite to the consumer of our pork in foreign countries. It was incontestable that a certain proportion of our pork was infested with trichinæ, since these worms had been found both by foreign inspectors and by our own sanitarians; and on this account American pork had been prohibited from entering nearly all the countries of the continent of Europe. This involved a loss of trade amounting annually to about $50,000,000.

In the course of the negotiations with reference to this trade facts developed which seemed to indicate that the process of curing our salted meats destroyed the trichinæ. It consequently became important to know as soon as possible if this conjecture was correct, and if so, the length of the period after which the trichinæ in salted meats might be safely considered dead and harmless. This parasite as it appears in the muscular tissues of swine is a minute worm that can only be seen by using the microscope, and is then found coiled up and generally surrounded by a wall of newly formed tissue.

The parasites have the same appearance whether they are dead or alive, and, consequently, it was necessary to adopt some method of experimentation to determine whether the trichinæ in any given piece of pork had been killed by the curing or whether they were still alive. Two methods had been proposed to accomplish this. One was to apply heat to the preparation containing trichinæ and watch through the microscope for any slight movements which the worms might make. There were two objections to this method, which made it unreliable and inconclusive. One was that the living trichinæ did not always show movements under this treatment, and the other was that the variation of temperature and unequal distribution of the warmth might

cause apparent movements in worms that were dead. The second method was to feed trichinous pork to animals and kill the animals for examination after a sufficient time had elapsed for the development and multiplication of the trichinæ. If the immature trichinæ existing in pork had developed to the mature form in the intestines of the experimental animals, and particularly if they had produced their young, that was positive proof of their living condition. On the other hand, if there had been no multiplication the harmlessness of the parasite was demonstrated.

By this method the Department of Agriculture assured itself that fully cured pork was not a dangerous article of food even if it contained trichinæ. This conclusion led to a careful investigation of the outbreaks of trichinosis in Germany which had been attributed to American pork, and it has been clearly shown from German evidence that these outbreaks were with one possible exception all caused by pork produced in Europe.

To return to the experiments, the animals most convenient for testing the vitality of trichinæ by feeding experiments are first, cats, and secondly, rabbits. I might also state parenthetically that such experiments have also been made by various investigators to determine the amount of cooking required to make trichinous meats safe for human consumption. Now, suppose this proposed law had been in operation, what effect would it have had upon such experiments? Would it have allowed us to go ahead freely and carry them to a successful termination? Would it have simply caused inconvenience? Or would it have been prohibitory?

Let us turn to the bill for our answer. Section 1 provides—

> That hereafter no person shall perform on a living vertebrate animal any experiment calculated to give pain to such animal, except subject to the restrictions hereinafter prescribed.

It would doubtless be held that the production of trichinosis in an animal causes pain. How much pain is caused, it is difficult to decide. The disease causes much suffering in man, but probably far less in animals. It is certainly an experiment *calculated* to give pain, and is therefore subject to all the restrictions of the bill.

Suppose it had been decided that cats were the best experimental animals for our purpose. We turn to section 2, (*e*) Third, and read:

> Notwithstanding anything in this Act contained, no experiment calculated to give pain shall be performed on a dog or cat, except upon such certificate being given, as in this Act mentioned, stating, in addition to the statements hereinbefore required to be made in such certificate, that for reasons specified in the certificate the object of the experiment will be necessarily frustrated unless it is performed on an animal similar in constitution and habits to a cat or dog and no other animal is available for such experiment.

That provision excludes the cat, because rats, guinea pigs, and rabbits are certainly available. That is, notwithstanding the matter of convenience, notwithstanding the investigator's opinion that the cat would yield more reliable results, notwithstanding the delay which sometimes occurs in obtaining the other species of animals, a cat can not be used for this experiment.

The investigator then decides that he will conduct his experiments with rabbits, and he turns to the bill to see what restrictions apply to this animal. He scans the bill from beginning to end and, failing to find the rabbit specified, he settles himself down to a methodical search

for the various traps and pitfalls which are hidden away in the different sections of the act and which he would be liable to step into by feeding trichinous meat in an experimental way to the animal mentioned. In section 2, paragraph (*c*), he reads:

(*c*) The animal must, during the whole of the experiment, be completely under the influence of ether or chloroform sufficiently to prevent the animal from feeling pain, excepting only that in so-called inoculation experiments or tests of drugs or medicines, the animal need not be anæsthetized nor killed afterwards, nor in tests of surgical procedure need animals be kept completely anæsthetized during the process of recovery from the surgical operation. Otherwise than this the animal must be kept from pain during all experiments.

This is not an inoculation experiment nor a test of drugs or medicines, consequently the animal must be kept during the whole of the experiment, a period of two or three weeks, completely under the influence of ether or chloroform; an absurd requirement, and one with which it is impossible to comply.

With this proposed measure in force it would therefore have been impossible to have conducted the experiments by which have been determined the length of time that meat must be cooked and the period during which it must be in salt to destroy this dangerous parasite. Here is one class of useful experiments entirely prohibited by this bill, and nevertheless the results of these experiments are necessary to enable humanity to intelligently protect itself from this common parasite which causes death after the most excruciating suffering. And yet any butcher can feed trichinous meat or offal to dogs, cats, pigs, rats, or any other animals, causing trichinosis in them, and so long as it is not an experiment he does not violate the law.

TEXAS FEVER INVESTIGATIONS.

I will now invite your attention to an entirely different line of researches. When the Bureau of Animal Industry was created, in 1884, the cattle industry of the United States was suffering heavy annual losses from a mysterious disease known as Texas fever. There was infection in the stock yards, in the stock cars, and in the streets over which cattle from the South had been driven. The disease appeared as a high fever, with rapid loss of strength, and death in 50 to 90 per cent of the cases. Sometimes as many as 150 cattle would die on a single ship from this disease, being one-third of a cargo of export beeves. The reputation of our cattle in foreign markets was damaged, and the losses from the disease upon the farms of this country were enormous.

The disease at that time was unmanageable because its nature was not understood. The cattle from the South, which spread the contagion, were apparently healthy, while the Northern cattle, which showed the most acute symptoms, apparently had no power of propagating the malady. The portion of the South from which the infection was brought was poorly defined, and as the infectious cattle presented no symptoms of disease, it was practically impossible to say whether any given lot of cattle was dangerous until after it had caused disease and it was too late to guard against the loss. How was this disease to be controlled, how were these losses to be prevented, was one of the great problems presented to me for solution.

The disease was so different from any that had been previously described; there were so many mysteries connected with the dissemination of the contagion; so many theories, or rather conjectures, in

regard to its origin; it appeared so suddenly and with so little warning in summer and disappeared so completely with the advent of cold weather, that its control without more facts was hopeless. It could only be studied during a short period of each year, and presented few vulnerable points of attack. The first problem was to determine the extent and boundary of the district from whence came the cattle that disseminated the contagion. The native cattle in this district were themselves healthy, and our only guides were to trace back to their origin the cattle that had caused outbreaks of the disease, or to observe what happened to northern cattle that were taken from the Northern to the Southern States. If southern cattle caused disease in the North, we concluded that the section in which they were raised was in the infected district; and if northern cattle taken to the Southern States contracted Texas fever, we concluded that the section to which they were taken was in the infected district.

After collecting all the facts of this kind that were attainable, it was clear that the infected district was of enormous extent, reaching from the Atlantic coast of Virginia southward and westward to the Rio Grande. In such a vast area of territory there were many sections from which we could secure no information and in regard to which it was necessary to conduct experiments in order to learn the facts. These experiments were made either by bringing cattle from such doubtful sections to the Northern States and exposing Northern animals to them, or by sending Northern animals to the doubtful localities and exposing them upon the roads and ranges traversed by the native stock.

What I desire to emphasize in this connection is that if this proposed law had been in effect where these experiments were made, they would have been absolutely prohibited, and it would have been impossible for us to have accumulated facts in that manner in order to accurately determine the infected district, and establish quarantine lines within a reasonable time. That is to say, the disease produced by such experiment is calculated to give pain, and is, therefore, subject to the restrictions of section 2, paragraph (c), and not being an inoculation experiment or a test of drugs or medicines, the animals must be kept completely under the influence of ether or chloroform during the whole of the experiment. And as the experiment might continue from three weeks to three months, the impossibility of maintaining anæsthesia need not be dwelt upon.

While the infected district was being investigated, inoculation experiments were made to find in what part of the diseased animal's body the contagion was located, the ultimate object being to discover and study the microscopic organism to which it was supposed to be due. Such experiments showed that the contagion resided in the blood, and a careful microscopic study of the blood, extending over several years, demonstrated the existence in the red corpuscles of a minute protozoan parasite, which destroys these corpuscles so rapidly that in diseased animals they are reduced from a normal of 5,000,000 or 6,000,000 in a cubic millimeter to less than 1,500,000.

The infected district was quite clearly outlined by the time the discovery of the microscopic parasite in the blood had been made, and it was then noticed that this infected district corresponded throughout with the habitat of a tick which was a common parasite upon the Southern cattle. This tick had often been accused by stockmen of causing the disease, but this was only one of a number of conjectures as to its

origin, and it was at that time so difficult to harmonize the known facts with the tick hypothesis that this was almost universally rejected by persons who gave the question serious study.

The discovery of the microscopic protozoa in the blood was accepted at that time as bearing against the view that the ticks had any part in the causation of the disease. Nevertheless, the coincidence between the Texas fever district and the permanent home of the ticks, extending over a belt of territory some 3,000 miles in length, was so extraordinary that it demanded scientific investigation.

There were three opinions as to the manner in which the ticks might cause the disease. One was that the numerous ticks piercing the skin and probably introducing some poisonous secretion set up so much local inflammation that this caused fever and death. A second was that vast numbers of young ticks covered the grass where the Southern cattle had been pastured, and these ticks taken into the stomach with the food produced inflammation, fever, and death. These were the views generally held by the stockmen. When the protozoa were found in the blood of affected animals, the only reasonable hypothesis was that if the ticks were concerned in the etiology of the disease it must be by directly carrying particles of blood containing the contagion from the Southern cattle to Northern animals. These questions could only be solved by experimentation—by vivisection as the advocates of this bill choose to call it.

We first gathered together millions of young ticks and fed them to cattle without producing disease. We tried to take ticks from the Southern cattle and place them upon susceptible animals, but we found it was not their nature to leave one animal to go to another. After they have once fixed themselves to the skin they remain there until they become mature and are ready to drop to the ground, lay their eggs, and die. We had, therefore, proved that the disease was not caused by taking ticks into the digestive organs, nor by the direct transfer of contagion from animal to animal by the ticks. If this proposed law had been in force and disease had resulted, the investigator would have been subject to the penalty therein provided, since these are not inoculation experiments, and it is impossible to keep the animals under anæsthetics during the whole time of the experiment.

Another experiment was made in the following manner: A number of Southern cattle were brought to the experimental farm in the District of Columbia and divided into two lots. From one of these lots every tick was carefully removed by hand picking; the other lot was left with the ticks upon it. These two lots of Southern cattle were then placed in separate pastures, where Northern cattle were exposed to them. The disease developed in the pasture where the Southern cattle, bearing ticks, were placed; but the Southern cattle without ticks were shown to be harmless. To make this conclusion free from doubt, we placed Northern cattle in another pasture where no Southern animals had been, and we strewed over this pasture a number of mature ticks gathered from Southern cattle. In this pasture, also, the disease developed, proving conclusively that the contagion was disseminated by the ticks. It still remained to be determined whether the contagion adhered to the old ticks, and in that way infected the pasture, or whether the young ticks hatched from their eggs had the power of causing the disease. The former conjecture appeared far the more reasonable, but it was wrong. Young ticks hatched in the

laboratory and placed upon Northern susceptible animals, regularly caused the disease.

Senator GALLINGER. I wish you would point out the provisions of the bill that would prevent such experiments.

Dr. SALMON. The provisions are in plain English.

Senator GALLINGER. I have read the bill a dozen times.

Dr. SALMON. It provides that no experiment calculated to give pain can be performed except inoculations and tests of drugs and medicines, unless the animals are kept under chloroform or ether during the whole course of the experiment.

Senator GALLINGER. I should think that the taking off of the ticks would be calculated to alleviate pain.

Dr. SALMON. If this law is strictly construed by the courts it will prevent the manufacture and use of the antitoxins and serums now coming into use, because every time we inject a serum into a cow it is an inoculation experiment, and is calculated to produce more or less pain.

Senator GALLINGER. Inoculation experiments are excluded, are they not?

Dr. SALMON. No, sir; they are not.

Senator GALLINGER. Oh, I think they are.

Dr. SALMON. If you have here a copy of the bill I will show you. [Taking up a copy of the bill.] I will read from section 2 of this measure.

SEC. 2. That the following restrictions are imposed by this Act with respect to the performance on any living vertebrate animal of an experiment calculated to give pain to such animal; that is to say:

* * * * * * *

(*c*) The animal must, during the whole of the experiment, be completely under the influence of ether or chloroform sufficiently to prevent the animal from feeling pain, excepting only that in so-called inoculation experiments or tests of drugs or medicines the animal need not be anæsthetized nor killed afterwards, nor in tests of surgical procedure need animals be kept completely anæsthetized during the process of recovery from the surgical operation. Otherwise than this the animal must be kept from pain during all experiments.

The only exception made is that the animal need not be completely anæsthetized during the experiment; all other restrictions in the bill apply to inoculations as well as to other experiments.

There is another paragraph of that same section (the second section) to which I wish to invite your attention in connection with your inquiry. That is paragraph (*a*), which reads as follows:

(*a*) The experiment must be performed with a view to the advancement by new discovery of physiological knowledge or of knowledge which will be useful for saving or prolonging life or alleviating suffering.

That is, every experiment must be made with reference to new discoveries. Unless an experiment is made for the discovery of new knowledge it violates this provision of the bill, and it makes the man who violates it a criminal whether it is an inoculation or some other kind of an experiment.

Senator GALLINGER. Your time, Dr. Salmon, has expired, I regret to say.

Dr. SALMON. I regret it also, because there are some other points in the bill to which I should like to call attention.

Senator GALLINGER. In the case of papers that have been partially read they may be submitted in complete form, but in the case of new papers put in, they will go in as an appendix.

Dr. Salmon's statement continued as follows:

Here, then, were three other kinds of experiments, yielding the most valuable results, but all of them prohibited by this bill. There was the exposure to cattle having ticks upon them, exposure to pastures where ticks had been placed, exposure to young ticks hatched in the laboratory. All produced fatal disease, all were calculated to give pain, yet none were inoculation experiments; and therefore, by this bill, could only be conducted if the animals were kept during the whole experiment under anæsthetics.

The advocates of this bill quote various alleged authorities to prove that no good has come from experiments upon animals. These are mere assertions. The Department of Agriculture presents the case of Texas fever, a disease investigated under its direction and controlled through the knowledge thus obtained. Infectious cattle are now recognized not only by the district from which they come, but by the ticks which they bear upon the external surface of their bodies.

The separation of the dangerous cattle is now so easily and so thoroughly carried out that a case of Texas fever among export cattle is a very rare occurrence, and infection in our numerous stock yards is almost equally rare. Cattle to be taken South as breeding stock are now first inoculated with the blood of Southern cattle, by which they may be given a mild attack of the disease and immunity from it during the remainder of their lives. This has reduced the loss from Texas fever among such animals from 90 per cent to less than 10 per cent. Experiments are now in progress with a view to finding a cheap and reliable method of destroying the ticks upon the Southern cattle. If this can be accomplished the last difficulties, from a scientific point of view, will be mastered, and the disease can be eradicated from our territory.

THE PREVENTION OF BLACKLEG IN CATTLE BY VACCINATION.

I would now invite attention to another destructive disease of cattle about which the general public hears very little. This disease is known as blackleg or symptomatic anthrax, because it appears as a dark tumor or swelling, usually in the muscular parts of one of the limbs. It is an extremely virulent disease, always fatal within a few hours. This disease was formerly considered as identical with anthrax, but the discovery of the bacillus of anthrax led to experiments in France about twenty years ago which proved this disease to be caused by an entirely different germ. They also led to the discovery of a vaccine by the use of which the disease may be prevented. Something over two years ago the Department of Agriculture began making and distributing this vaccine, requiring a report from each person using it as to the results obtained.

The information thus gathered is not only surprising but is a remarkable illustration of the practical results which have followed the study of disease by experiments upon animals. Last year the Department had requests for 500,000 doses of this vaccine from persons who stated that their herds were affected and that they wished to use this vaccine upon their own stock. At this time the requests are coming in at the rate of 1,000,000 doses a year. The reports received and tabulated show that in the herds treated the losses before treatment had averaged from 10 to 25 per cent of the young stock each year. In the year succeeding the vaccination the loss was reduced to 0.6 per cent. If the

present demand is a correct index of the extent of the disease, it indicates that the grazing lands producing 20 per cent of the beef cattle of the United States are infected; that is to say, the disease is mostly confined to beef stock, and as there are about 5,000,000 beef cattle killed at our large abattoirs annually, the 1,000,000 young stock vaccinated yearly represents one-fifth of the number annually marketed. This gives some idea of the prevalence of the disease, since only those herds are vaccinated in which it appears.

If we estimate the annual loss at 10 per cent of the young stock in the infected herds and these herds contain 1,000,000 young animals, the loss would be 100,000 head a year. If this loss is reduced to six-tenths of 1 per cent by vaccination, the loss would then be but 6,000 head and the saving would be 94,000 head. These figures are a fair estimate from the present rate of distribution and the returns actually received for last year. Ninety-four thousand head of cattle at $20 per head are worth $1,880,000, and the vaccine for saving them costs less than a cent a dose, or, say, $10,000.

So much for the value of experimentation on living animals. Now let us inquire what effect the proposed legislation would have upon this work. To make blackleg vaccine we must have the flesh of animals which have died of the disease. Consequently we must occasionally inoculate a calf and sacrifice it for the benefit of its fellows. We must also test the strength of each lot of vaccine by inoculating guinea pigs and observing its effect upon them. Both of these classes of inoculation are prohibited by this bill; that is, these are experiments calculated to give pain, and according to section 2, paragraph (*a*), all such experiments "must be performed with a view to the advancement by new discovery of physiological knowledge, or of knowledge which will be useful for saving or prolonging life or alleviating suffering." This is not a case of "new discovery" at all; it is the application of an old discovery, and if this bill were a law it would stop the manufacture of this vaccine.

EXPERIMENTS WITH GLANDERS.

One of the most common and most dangerous of the contagious diseases of horses is glanders. This disease may be communicated to man, causing a most loathsome condition, which usually ends in death. It is a remarkable fact that this disease, now so well known and so universally admitted to be contagious, was regarded during the first forty years of this century, especially in France, as noncontagious. Some of the most eminent teachers of that period promulgated the theory of spontaneous generation and noncontagiousness. It was accepted by the Alfort Veterinary School, the principal institution of this kind in France, and the one at which the army veterinarians were educated. As a consequence of incorrect ideas as to the nature and prevention of the disease, it spread rapidly among the army horses, and by the sale and distribution of these animals when they were no longer useful in the army it was carried to the farms throughout the whole country.

The plausibility of the arguments that were advanced to prove the origin of glanders from unsanitary surroundings and overwork is remarkable. However, the improvement of the stables, the more generous rations which were furnished the horses, the decrease of the work required, all failed to bring the expected elimination of the disease.

Glanders continued its ravages practically as before these measures were adopted.

In 1837 a French surgeon, Rayer, recognized a resemblance to glanders in a disease affecting an inmate of one of the Paris hospitals. The disease was not uncommon at the time, and was known as putrid or adynamic fever. Following the idea that this disease resembled the glanders of the horse, Rayer made an inquiry which revealed the fact that the patient was a groom, and that he had had horses under his care which were affected with glanders. This confirmed the suspicion that the man was affected with the same disease, though, on account of the frequency of glanders among horses at that period, it might only be a coincidence.

Rayer undertook to determine this matter in the only manner by which it was possible to obtain conclusive evidence, viz, by inoculation experiments. If the disease from which the groom was suffering could be inoculated upon a horse and produced the characteristic and well-known symptoms of glanders, this would be a demonstration that the man was affected with the equine disease. The test was made, and the inoculation produced typical glanders in the horse. This striking experiment had great influence in changing the current views in regard to glanders, and it led to the appointment of Rayer upon a Government commission to investigate the communicability of the disease from horse to horse. Two experiments were made by this commission. In the first experiment ten healthy horses were stabled with eleven horses presenting the symptoms of chronic glanders, the animals being so placed that each healthy horse was between two diseased ones. As a result of about four months' exposure, nine out of ten healthy horses showed symptoms of glanders, and with four animals the disease was so fully developed as to be entirely characteristic. Those who disbelieved in contagion objected to this experiment on the ground that the animals might have been affected before the experiment began, and for this reason a second test was made with seven selected horses, which were placed two by two in the stable, so that each healthy horse came in contact only upon one side with a glandered horse. At the end of four months' exposure glanders had developed in every one of the experimental animals.

The report of these experiments had a great influence in changing the views in regard to the contagiousness of the disease. Confirmatory experiments were made elsewhere, and within a few years the measures for its control were radically changed. The attention of sanitarians was directed to the destruction and exclusion of the contagion rather than to attempts to check the disease by modifications of the stables, the rations, and the exercise or work. Where proper measures are enforced to prevent infection, glanders has become a rare disease, and I am not aware of one civilized country which has not accepted the experimental demonstration that it originates from contagion, and not de novo from unsanitary conditions.

If Dr. Rayer had been a Washington surgeon, and if the groom with suspected glanders had been an inmate of a Washington hospital, with the proposed bill in operation at the time, there would have been very serious difficulty in making the experiment to determine the nature of the man's disease. It would have been necessary for the surgeon to give a certificate, as provided in section 2, paragraph (*e*) third, that the object of the experiment about to be made would be necessarily *frustrated unless it* was performed upon a horse, ass, or mule, and that

no other animal was available for that purpose. Then it would be necessary to secure upon this certificate the signatures of three physicians duly licensed to practice and actually engaged in practicing medicine in the District of Columbia, and also the signature of a professor of physiology, medicine, anatomy, medical jurisprudence, materia medica, or surgery in the medical department of a duly established reliable school or college in the District of Columbia, as provided in section 7. Then it would be necessary to wait a week before the certificate would be available.

But this is not all. Section 2, paragraph (*b*), requires that the person performing the experiment, if he is not a duly authorized officer of the Government of the United States or of the District of Columbia, must hold a license from the Commissioners of the District of Columbia, and to obtain this license an application must be made under section 7. This application must be signed, in the same manner as the certificate, by three physicians duly licensed to practice and actually engaged in practicing medicine in the District of Columbia, and also by a professor of physiology, medicine, anatomy, medical jurisprudence, materia medica, or surgery in the medical department of a duly established reliable school or college in the District of Columbia. Finally, it would be necessary to register in some unspecified manner, and in accordance with section 3, the place in which such experiment was to be performed. If the surgeon had the time and the patience to fulfill all of these requirements, and the man had lived until the certificate became available and the license had been granted, the experiment might be proceeded with.

The inoculation having been made and positive results obtained, if the surgeon had invited the public to the stable to see the effects of the experiment, as an object lesson and warning to those who handle diseased horses, he would have violated the fourth paragraph of section 2 (*e*), and would have been guilty of an offense having a maximum penalty of $150.

The experiment made by the French commission to determine whether glanders was contagious from horse to horse would have been absolutely prohibited, because it is not an inoculation experiment nor a test of drugs or medicines. It therefore comes under the general provision of section 2, paragraph (*c*), requiring that the animals must be anæsthetized during the whole of the experiment, which is an impossible condition.

These few examples of ordinary experiments have been specified to illustrate the numerous prohibitions and the inconvenience and delay that would be caused by the provisions of this bill. Nor are these cases exceptional or their importance unduly exaggerated. On the contrary, we have the same problems to work out with tuberculosis as we had with glanders. The danger of meat, milk, and butter from tuberculous animals must be clearly determined experimentally before we can properly estimate the danger to the human consumer from these products or guard against it. The Southern Mississippi Valley is ravaged by anthrax, which must be prevented, if at all, by vaccination. The swine growers of the country are losing $75,000,000 worth of swine a year—a loss which, so far as is now known, can only be materially lessened by the use of antitoxic serum. There are sometimes outbreaks of tetanus among herds of farm animals—a disease easily checked by the use of tetanus antitoxin. Influenza antitoxin is being

used to immunize horses and protect them from this disease while they are in transit to home or foreign markets.

The bill under consideration would indirectly or directly prohibit these investigations and these forms of preventive treatment wherever it was in operation. The scientist could not expose healthy to tuberculous cows to learn the effects of sanitary measures in controlling the disease, without being liable to the penalties of this bill, because this is not an inoculation experiment;[1] but any laborer or dairyman can stable diseased with healthy cows and sell the infected product with impunity for human consumption. We could no longer inject mallein into a horse to learn if it has glanders; we could not inject tuberculin into a cow to learn if it has tuberculosis; we could not prepare mallein, tuberculin, blackleg or anthrax vaccine, or any of the antitoxins; we could not inoculate a rabbit to determine if a dog which had bitten a child was or was not affected with rabies. In none of these cases would the necessary inoculations be performed, as required by section 2, paragraph (*a*), with a view to the advancement of knowledge by new discovery. They are simply the application of knowledge already gained.

In my opinion this bill would practically prohibit the scientific work now being conducted by the Bureau of Animal Industry to learn the nature of the contagious diseases of animals and to apply vaccines and antitoxins for their control. It would be an untold damage to the stock raisers of the country, depriving them of the efforts of science in their behalf and preventing the use of the modern discoveries that have been mentioned. It is modeled after and is more radical than the British act of twenty-five years ago, since the passage of which vast progress has been made by experiments on animals in our knowledge of the pathology and treatment of animal disease. The farmers of the country should be allowed the benefit of this progress, and they have the right to expect that the legislation of to-day shall recognize the advances of the last quarter of a century.

The Department of Agriculture considers the provisions of section 5 as incongruous and objectionable. This section gives the Commissioners of the District the authority to direct the investigators of that Department, if they are performing such experiments, to make reports to them of the methods employed and of the results of such experiments. This power of the local authorities would, if exercised, inter-

[1] The suggestion was made to me after the hearing that the word "inoculation" might be construed to include infection by ingestion and cohabitation. I had given that aspect of the question some consideration before reaching a different conclusion. Inoculation, as the word is commonly and almost exclusively used by investigators, and I believe by most other persons, means the act of inserting the infectious agent into the skin or flesh. We do not say we inoculate cattle when we drive them across an infected pasture or put them into an infected stable. The accepted usage of a word is usually followed in construing a law. Admitting that "inoculation" is sometimes used figuratively as synonymous with "infect," there is no reason to suppose that a court would accept this broader and unusual signification. This would be especially unlikely in the present case, where the word "so-called" qualifies the word "inoculation." This word "so-called" was undoubtedly inserted for a purpose, and that purpose could only be to restrict the application of the word inoculation to the so-called, i. e., commonly called, inoculation experiments, and to prevent its application to that wider field which possibly might otherwise be covered by the word if given its broadest meaning. Considering the great interests affected, if it were intended by the framers of the bill that the word inoculation should include the other classes of experiments mentioned, then the language should be made so clear that there would be no danger of a misinterpretation. The bill should *not on its face say directly* the contrary of what it is alleged to mean.

fere with the Department work and absorb a large amount of valuable time. The subordination of the Federal service to the local authorities in this respect would be undesirable and injurious. The work is conducted for the benefit of the farmers in the country at large, and the District of Columbia, with insignificant stock interests, should not have the power to control or interfere with it. For all of these reasons the Department respectfully requests that in case this bill is reported by your honorable committee, a clause be inserted to the effect that its provisions shall not apply to any experiments performed under the direction of the Secretary of Agriculture.

Dr. KEEN. Dr. William H. Welch, the next speaker, is Professor of Pathology in the Johns Hopkins University, Baltimore.

STATEMENT OF DR. WILLIAM H. WELCH, PROFESSOR OF PATHOLOGY, JOHNS HOPKINS UNIVERSITY.

Dr. WELCH. Mr. Chairman, it is most significant that, notwithstanding your suggestion at the outset of this hearing that time might be saved by the omission of a detailed presentation of the benefits of vivisection, inasmuch as this bill, it was said, is not intended to hinder useful experimentation upon animals, so large a part of the remarks of the previous speakers upon both sides has been devoted to a discussion of this very subject. In truth it could not be otherwise, for the principal line of division between the advocates and the opponents of this bill is marked by their opinions upon the utility of animal experimentation.

However much the advocates of the bill may assert that its enactment will not interfere with the proper uses of such experimentation and is designed only to check abuses, it is to be noted that the main part of their argument is an attack upon the practically unanimous opinion of well-informed scientific and medical men that experimentation upon animals is essential to the advancement of physiology and medicine and has conferred inestimable benefits upon mankind. Nor is it surprising that antivivisectionists should cling tenaciously to this position, indefensible as it has become, for it is apparent that those who are convinced of the great value of experiments upon animals to science and humanity will hesitate long before approving any legislation likely to check the progress of scientific and practical medicine.

Men who hold this conviction are not likely to give any favorable consideration to legislative proposals intended to restrict the use of an important method of scientific research until it has been demonstrated that its possible abuses are in fact common and great and uncontrollable by existing legislation and by public opinion, including that of the medical profession. They will inquire carefully whether the proposed legislation will actually reach the abuses which may exist, and, even if it should do so, whether it may not do more harm than good by obstacles put in the way of proper and useful experimentation. They may even pause to consider whether there may not be some inequality in singling out for penal legislation the infliction of pain upon the lower animals for the purposes of biological and medical science, while leaving untouched an immeasurably greater amount of suffering inflicted upon animals by man for his food, his adornment, his amusement, and other objects which it would be difficult to show are higher and more worthy than those of the physiologist and the physician.

I have sometimes wondered at the attitude of mind of professed humanitarians, who are so eager to collect all testimony, even the most obscure, trivial, and discredited, which may make the public believe that some new remedy or improved method of treatment, such as antitoxin or antiseptic surgery, demonstrated to the satisfaction of most physicians to be a priceless boon in saving human lives and relieving suffering, is of no value whatever. Still I must admit that, for the sake of their cause, the antivivisectionists do well to ransack, as they do, medical journals and books for statements which may minimize the effects upon the public of the constantly increasing evidences of the benefits to mankind, and indeed to animals also, derived from the results of animal experimentation.

Of course they can find statements in contradiction of almost any generally accepted truth in medicine, as they could in any science, but in view of the proverbial disagreements of doctors and of the little interest which most of those who apply scientific discoveries have in informing themselves of the sources of their knowledge, it is upon the whole surprising that the familiar list of medical quotations, which has so long done duty in antivivisectionist publications in opposition to the great value of experimentation upon animals, should be so meager, in contrast with the enormous preponderance of testimony upon the other side, and should be representative of so few names of eminence—I believe scarcely one which would be generally recognized by physicians as of a writer especially competent to speak upon this subject, however distinguished in other lines. So rapid have been the advances in recent years of medicine and surgery, attributable to knowledge gained from experiments upon animals, that it may be urged that an adverse opinion expressed even a decade ago would be reversed to-day; but I am not sure that the exceptional physician who was blind to this source of light at any time since the days of Harvey would see it to-day, notwithstanding its greatly increased brilliancy.

It has seemed to me appropriate, Mr. Chairman, to say this much in explanation of the emphasis laid by previous speakers upon the subject of the utility of vivisection, but it is not my purpose to set forth the actual benefits secured by this method of investigation. This has already been done by Dr. Keen, Dr. Hare, and other speakers, although none of these gentlemen would claim that he had been able to present a tithe of the debt which physiology and the healing art owe to the results of animal experimentation. Those of the public who wish fuller knowledge upon this subject and who care to read a larger part of the evidence which has led the vast majority of the most humane of professions to approve of vivisection, I would refer to the recent book by Stephen Paget, F. R. C. S. Eng. "Experiments on Animals, with an introduction by Lord Lister" (London, 1900).

One other point before I pass to the examination of the bill before us. I shall be so bold as to remind the distinguished lawyers on the other side, who have to-day so recklessly charged those who experiment on animals with cruelty, that the legal definition of cruelty given by the Century Dictionary is—

> An act inflicting severe pain and done with wilfulness and malice.

Judge Hoar, in a Massachusetts case, says—

> Pain inflicted for a lawful purpose and with a justifiable intent, though severe, does not come within the statute meaning of cruelty.

While I do not deny that cruel experiments, in the sense of heedless causing of pain, have been made, I am convinced that they are very exceptional. The accusation of cruelty, when made, as it often is by our opponents, against experimenters on animals, as a class, is false and slanderous. In no other group of cases in which animals are made to suffer for the benefit of man is equal care exercised to avoid the infliction of needless pain.

The difference is simply immeasurable between the solicitude in this regard and the quantity of actual suffering inflicted in scientific experiments on the one hand; and on the other hand the heedlessness and the vast unnecessary amount of pain inflicted in the slaughtering, the sexual mutilation, the transportation, the poisoning, and the hunting, trapping, and shooting of animals. On the one side hundreds; on the other, millions of animals are concerned annually: on the one side a serious purpose to advance scientific knowledge and directly promote the healing art; on the other, the satisfaction of appetite, often in a luxurious way, the exercise of some convenience or economy, the gratification of the desire for sport or of some whim: on the one side insensibility to pain secured by anæsthetics, as a rule, whenever practicable; on the other, very little regard to the avoidance or reduction of unnecessary suffering.

Mr. Chairman, in speaking on a previous occasion of the self-sacrifice and benevolence of the members of the medical profession, you said that "no legislation should be enacted that would unnecessarily hamper them in their pursuit of useful knowledge," and you have to-day very properly asked that it shall be pointed out in what way the proposed legislation would interfere with useful experiments—with such experiments, for example, as those cited by Dr. Keen and other speakers. It is asserted with much insistence by its advocates that this bill is "moderate," "reasonable and wise," "restrictive and not prohibitive," "not an antivivisection measure," "does not impede in any way the proper use of animal experimentation," "goes to the farthest extreme of concession in the anxiety of its framers to yield to the wishes of scientific men so far as may be consistent with the principle of legal supervision," "concedes everything of utility."

It is my especial purpose to examine these contentions in the light of the specific provisions of the bill, and I hope to be able to demonstrate to the satisfaction of the members of this committee that this bill is unnecessary, is vague and contradictory in some of its provisions, places the entire control of a scientific method of investigation in the hands of laymen not qualified to exercise such arbitrary powers, absolutely prohibits important and useful experiments, and can be administered so as to prohibit all experiments, surrounds the practice of animal experimentation with absurd and vexatious restrictions, and is capable of inflicting serious injury upon the progress of science and medicine.

I have already traversed much of this ground in my letter to a former member of this committee, the Hon. Arthur P. Gorman, printed as Senate Document No. 104, Fifty-fifth Congress, second session, which I beg leave to offer for your consideration. I would also call your attention to other documents of similar purport, especially the letter of the Secretary of Agriculture, the Hon. James Wilson, printed as Senate Document No. 112, Fifty-fifth Congress, first session; that of Dr. Dabney, president of the University of Tennessee and for-

mer Acting Secretary of Agriculture, to the chairman of the Committee on the District of Columbia, the Hon. James McMillan, and the recent letter of Dr. Woodward, the health officer of the District of Columbia, to the Commissioners of the District.

As Dr. Salmon has pointed out at this hearing, and as Dr. Woodward has shown in his letter just referred to, there is no need for additional legislation restricting the practice of animal experimentation in the District of Columbia. The existing law permits only "properly conducted scientific experiments or investigations, which experiments shall be performed only under the authority of the faculty of some regularly incorporated medical college, university, or scientific society." The bill before us attempts to define with considerable detail what constitutes a properly conducted experiment, and with what success I propose presently to show. A commission of scientific experts would, I believe, find it difficult, if not impossible, to prescribe with similar detail the proper conduct of all scientific experiments on animals, and most assuredly such experts have had no hand in the drafting of this bill. If it be asked, Who shall be the judge of the proper conduct of the experiments? I reply: In the first instance, the scientific men who act "under the authority of the faculty of some regularly incorporated medical college, university, or scientific society;" then the governing bodies of these incorporated institutions, and in the final decision the courts, as provided by the existing law, and most certainly not the Commissioners of the District of Columbia, as proposed in this bill.

There is not a particle of evidence that abuse of animal experimentation has ever existed or is likely to arise in the District of Columbia, or, if it should occur, of the inability of the present law to cope with it. I know that one can conjure up in his imagination horrible possibilities, to meet which no law would seem too severe, and that charges of atrocious cruelty are spread before the public by antivivisectionists with reckless disregard of the facts; but, sir, we court the fullest investigation by any impartial body of men of the actual conditions of animal experimentation in this country, and we are confident that such an investigation would show the groundlessness of these imaginings and the wantonness of these accusations. Before you recommend any such legislation as that embodied in this bill in the face of the unanimous protests of the scientific and medical societies and of the great body of physicians of this country, it surely seems incumbent upon your honorable body to make such an official investigation as we have often asked for.

Although we are here to discuss this particular bill, and not the general subject of legislative restriction of experimentation on animals, I am free to confess that I consider the public opinion of the medical profession, which is as sensitive to actual cruelty as that of any "humane society," an efficient safeguard in this matter, and amply sufficient when combined, as it is here, with an adequate law. As has been said, "probably the members of antivivisectionist societies do not believe that there is any such professional public opinion; but there is, and it is an effectual, though quiet, check on the few who need it. But if any influence from the outside could injure it, it would be the constant ignoring and denying of its existence. It is not generally found an incentive to honesty to tell a man "you would be a thief if you could, and therefore I shall keep all my goods under lock and key when you are about, and have my eye on you when you don't expect it." Weak

honesty grows strong when leant upon; but even strong humanity, insulted and disbelieved in, may hear itself called callousness until it ceases to care for the charge."

If all that could be said against the legislation proposed in this bill were its needlessness it might be allowed to cumber the statute books, with no charge against it more serious than meddlesomeness, albeit, to my thinking, that is not a light charge; but this legislation is very far from being harmless. While it must be difficult for those unfamiliar with the methods and results of scientific inquiry and practical work in the directions touched by this bill to realize fully all of the ways in which the provisions of this complicated measure would hamper investigations of importance to mankind, enough can be made clear to any reasonable man to show that neither this bill nor anything like it should ever be enacted into law.

Of the many faults of this bill there is none more serious in principle or likely to be more hurtful in the actual working of the proposed legislation than that this bill puts in the hands of men who need not be and are not likely to be physicians or men of science arbitrary powers, requiring skilled knowledge in their use, concerning matters of the highest importance to medicine and biological science and to the welfare of mankind. To the Commissioners of the District of Columbia, of whom two make a majority, is given uncontrolled power to determine by whom, where, and on what animals experiments shall be made, to disallow or suspend at any time permission once granted, to demand whenever they please reports in any desired form or detail concerning the methods and results of experiments, and to be, in the last resort, the supreme judges as to whether a certain experiment will advance by new discovery physiological knowledge or knowledge "useful for saving or prolonging life or alleviating suffering." No provision is made for an appeal or a hearing on the part of any applicant or experimenter who may consider himself aggrieved. Of the partial exemption of officers of the Government and of division of authority with the President of the United States I shall speak later.

Nobody can foretell in what manner the Commissioners will exercise these extraordinary powers if conferred upon them. It lies entirely in their discretion to grant all licenses and certificates or to refuse all and thereby prohibit all animal experimentation in the District except that conducted under severe restrictions by officers of the Government. I know of no reason why either of the two eminent lawyers who have spoken to-day for our opponents should not be considered qualified for the office of Commissioner of the District of Columbia, but entertaining the opinions on vivisection which they have expressed, how could they conscientiously grant a single license to experiment on animals? In whatever way the Commissioners might exercise their uncontrolled discretion, whether they made the law mean much or little, one thing is certain: In important matters requiring expert knowledge those who do not know would be put in supreme authority over those who know. This is a monstrously false and dangerous principle to embody in law. It needs knowledge, often a great deal of it, to do good, but none to hinder it.

It has been said that there is no more reason to object to the requirement of a license to experiment on animals than to that of a license to practice medicine. There are differences between the two cases, which I shall not pause to discuss, for this bill is not a simple licensing measure.

To make the conditions of the two cases analogous, in accordance with the provisions of this bill, the law to license practitioners of medicine should provide that a body of laymen should determine the qualifications of applicants and grant the license to practice; that additional certificates, obtainable only after considerable delay, should be required in case it was desired to treat certain classes of individuals; that the practice of each licensee may be limited to certain specified localities; that the permitted manner of treatment should be prescribed with some detail; that certain persons under 25 years of age considered by their colleagues competent to practice should be excluded from all possibility of securing a license, and that a body of inspectors with no statement as to their qualifications should keep the licensed practitioners under surveillance and should report from time to time upon their methods and results. Manifestly absurd as such requirements as these would be if applied to the regulation of medical practice, they are scarcely less absurd when applied, as proposed in this bill, to the legal regulation of animal experimentation.

It would seem reasonable, Mr. Chairman, that after an applicant has secured the necessary fourfold professional indorsement of his application and has been licensed by the Commissioners of the District of Columbia as one qualified to experiment on animals, he should then be allowed to go ahead with his investigations and make such experiments as the law permits in the way prescribed by the law; but no, if at any time the exigencies of his investigations require the use of a cat or a dog, he must procure in addition a certificate, or if it be a horse, mule, or ass, still another certificate, setting forth that without the use of the specified animals the objects of the experiment will be frustrated and that no other animal is available. A third kind of certificate, also setting forth the absolute necessity of the experiment, is required for the performance of experiments in illustration of lectures in medical schools, hospitals, or colleges. No certificate shall be available until one week after a copy has been forwarded to the Commissioners and, according to the English custom, usually the delay is much longer.

This array of certificates has proven to be one of the most annoying features of the English law. I shall not take your time to illustrate by examples the delays and impediments to research which they may cause, for is it not clear to you, gentlemen, that there are obstacles enough already placed in the path of the investigator by this act without adding these unnecessary ones? Does not this proposed law in its other provisions go far enough in its humiliation of medical and scientific men without emphasizing in this offensive way that even after a physician or man of science has been indorsed by four physicians, one of whom must be a professor in a medical college, and has been pronounced by the Commissioners of the District of Columbia to be qualified to experiment on animals, his judgment and humanity are still not to be trusted?

If I were to enter into a detailed criticism of all the objectionable features of this act, it would be easy to point out a number of faults of omission and of commission in the arrangements made by this bill for these various certificates and licenses, but in the time at my disposal I prefer to take up matters which seem to me more important for my argument, although not all more important in their effects in the actual working of the law. Before leaving this part of the subject,

however, I can not refrain from calling your attention to the unjustifiable and harmful discrimination made in section 4, which provides:

> That a license shall not be granted to any person under the age of twenty-five years, unless he be a graduate from a medical college, duly authorized to practice medicine in the District of Columbia.

This is one of several clauses added by the framers of this bill to the English act, in order to increase the already excessive restrictions of the latter.

This provision excludes graduates in zoology and other departments of biology, and also, in a measure, physiologists, pathologists, hygienists, bacteriologists, and pharmacologists under 25 years of age, for it is becoming increasingly the custom for experts in these branches not to enter the examinations required for the license to practice medicine. These experts, however, are just the ones best fitted to conduct most of the experimental investigations which this act seeks to regulate, and to discriminate in this way against them in favor of licensed practitioners is absurd and unjust. Dr. Dabney, in the letter already cited, says concerning the effect of this provision upon the work of the Bureau of Animal Industry:

> It would at once stop some of the experiments now in progress, and if it had been enforced in past years would have prevented a large proportion of our scientific employees from doing this class of work.

In this connection it is proper to inquire to what extent officers of the United States Government are placed under the authority of the Commissioners of the District of Columbia by the provisions of this bill. At present the larger part of the investigations requiring experiments on animals within the District of Columbia are conducted in the Bureau of Animal Industry, under the Department of Agriculture. The bill "for the further prevention of cruelty to animals in the District of Columbia," originally introduced in the Fifty-fourth Congress, first session, placed the officers of the Government completely under the control of the Commissioners of the District in respect of animal experimentation, although the experimental work of the Bureau of Animal Industry concerns itself with the agricultural and stock-raising interests of the entire country and only in relatively small measure with those of the District.

This was so manifestly improper that the original bill was amended so as to exempt "duly authorized" officers of the Government of the United States or of the District of Columbia from the necessity of securing a license to experiment from the Commissioners of the District (section 2 *b*). But if it was really the intention to insure exemption of officers of the Government from the control of the Commissioners of the District in their experimental work, the present bill is most carelessly constructed, for, as it now stands, any "duly authorized" officer of the Government desiring to use a cat, dog, horse, ass, or mule for the purposes of his experimental investigation must procure the special certificates from the District Commissioners, and

> The Commissioners of the District may direct any person performing experiments under this act from time to time to make reports to them of the methods employed and the results of such experiments in such form and with such details as the said commissioners may require.

It may be noted that it is not the head of the Department who is to be called upon to report, but such of his subordinates as may be engaged

in animal experimentation. Whatever may have been the intention of its framers, it is clear that this bill places important scientific work of Departments of the General Government to a large extent under the control of officials of the District of Columbia.

With reference to the designation "duly authorized officer of the Government," Dr. Woodward, in the letter cited, has pertinently remarked:

> It is by no means clear whether due authorization refers to the authorization to perform the ordinary duties of the office, or whether it refers to some special authority to perform experiments upon animals. If the former be intended, persons having no knowledge of scientific matters are at liberty to experiment at will; if the latter, there is no indication of the source or form of this "due authorization."

Among the large number of restrictions upon experimentation piled up in this act, that providing for the registration of places in which experiments are to be performed (section 3) arrests attention by not being mandatory like the others, except in the case of places for medical instruction. This provision, if enforced, is capable of causing much inconvenience to the experimenter. For example, an emergency may readily arise in which some inoculation test for diagnostic or other purposes can most advantageously be performed where the material obtained directly at autopsy or from a patient is at hand, and there may be good reason for not taking virulent material away from a locality already infected and introducing it into an uninfected registered place. If it were necessary, other illustrations of the possible hardships imposed by this provision might be cited, but I shall pass on to the subject which is dearest to the heart of the antivivisectionist, namely, public inspection of experiments on animals.

The bill provides (section 6):

> That the President of the United States shall cause all places where experiments on living vertebrate animals are carried on in the District of Columbia, to be, from time to time, visited and inspected without previous notice, for the purpose of securing compliance with the provisions of this act; and to that end shall appoint four inspectors, who shall serve without compensation, and who shall have authority to visit and inspect the places aforesaid, and who shall report to the President of the United States from time to time the results of their observations therein, which shall be made public by him.

It will be observed that this section introduces a second authority in the administration of this law. The Commissioners of the District grant the licenses of persons and places, and probably also the certificates, although with characteristic vagueness the source of the latter is not specified, while the President of the United States appoints the inspectors and receives their official reports. This division of authority would not seem conducive to the smooth working of the law and might readily lead to serious conflicts in its two-headed administration.

But the monstrous evil of this provision regarding inspectors is that not a word is said as to the need of any special qualifications on the part of those who are to scrutinize and report upon the experimental work of physicians and scientific men. The duties of these inspectors, according to the law, will require them to base their reports upon such matters as whether movements of an animal are manifestations of conscious pain or only of reflex action; whether experiments are conducted by competent persons and in a proper manner; whether they are useful in the ways specified in this bill; whether an experiment, if made on a cat, dog, horse, ass, or mule, might not be made on another *animal without* defeating the objects of the experiment, etc. Surely

some knowledge of physiology and some appreciation of the needs of medicine and surgery are required for the performance of the remarkable and responsible functions of these inspectors. The bill originally introduced provided that this inspection should be by an agent of the Washington Humane Society, a notoriously antivivisectionist society, which claims the responsibility for this bill.

It can not be doubted that this society and antivivisectionists in general will claim and in all probability will secure representation among the inspectors. It would be quite within the power of even one energetic and officious inspector, without physiological knowledge and opposed, as most antivivisectionists are, to all investigations requiring experimentation on animals, to make the conditions of experimental work simply intolerable. Anyone who has serious and legitimate business to attend to has a right to object to constant intrusion and disturbance, and work requiring delicate manipulations and undivided attention can not go on under such interruptions. When to this nuisance is to be added the publication of official statements concerning difficult matters of which the observer is not qualified to judge, I submit that before you impose upon experimenters this system of inspection you should be convinced that very great abuses are to be corrected and can be corrected by no procedure of a less drastic nature.

It is utterly misleading to draw any analogy between this sort of inspection and the inspection of banks and insurance companies, and it is a libel upon common sense to assert, as is done by advocates of this measure, that fear of the exposure of wanton cruelties moves experimenters to object to any such system of inspection as that proposed in this bill. It is not true that secrecy surrounds the practice of animal experimentation. Reports of experiments are published in detail. Any qualified person has free access to the laboratories where such experiments are made, but to throw them wide open to the public is open to the same kind of objections as would be similar publicity for surgical operations. The antivivisectionists are fond of quoting from an address by Dr. Parvin, delivered in 1891; but I have never known them to cite in their writings, except in garbled form, the following sentences from this address:

> Should the law restrict the performance of vivisection? I think it ought, chiefly as an expression of public sentiment and for the moral effect, for violations of its provisions could usually only be discovered by a system of espionage, by the employment of detectives, of spies and informers, utterly alien to our system of government, and who are as a rule abominable.

This quotation in antivivisectionist publications always, I believe, stops short with the first third of the last sentence.

Who are to be subjected to the visits and inspection of these officials? It can be confidently asserted that the inspection will be practically limited to laboratories under the supervision of scientific men of established reputation, who have been selected by universities, medical colleges, and heads of governmental departments for their recognized skill and knowledge.

Dr. Bowditch has told you that he knows of no private vivisections by students, and I can say the same. Vivisection by physicians in their homes is very uncommon. Mr. Chairman, the men who, as you said on a previous occasion, do not need legal enactments, are precisely the ones who are to be subjected to the annoyances of this system of inspection and in general to the vexatious restrictions of this bill, while,

if the class of persons for whom this bill is said to have been framed really exist and now keep effectually concealed without any apparent motive, I do not see how this law is likely to reach them, after their detection will lead to the infliction of a severe penalty.

Not only are the inspectors to make reports of the results of their observations, which shall be published by the President of the United States, but the Commissioners of the District may direct any experimenter to make reports of the methods and results of his experiments "in such form and with such details as the said Commissioners may require."

The hardship which would be imposed upon an investigator by the demand for the methods and results of half-finished researches and by the publication of reports thereon by those without any comprehension of their nature can not be fully appreciated by those unfamiliar with the conditions of scientific inquiry, but it is not difficult to see that if the administration of the law is in the hands of those unfriendly to experimental investigations in biology and medicine, these provisions can be utilized to harass experimenters almost beyond endurance.

Those unacquainted with the real purposes and the methods of antivivisectionists would probably not anticipate one of the uses to which can be put the official records of licenses and certificates and the reports of experiments, but it is interesting to note that Sir John Simon, the most eminent of English sanitarians, formerly medical officer of Her Majesty's privy council, in his testimony in 1875 before the royal commission on vivisection, clearly predicted this use or rather abuse.

In replying to questions as to his opinion of a law embodying this system of licenses, inspection, and official returns of experiments, he said (Report of the Royal Commission, etc., p. 77, London, 1876):

> I think it would not be a security for animals, and I think it would give facilities for the persecution of physiologists. I think that physiologists under law of this sort would in these days run some risk of being treated as Vesalius was three centuries ago. * * * I should be very unwilling, I confess, to see physiologists put in a position in which those who are now making clamor on these subjects should be able to hold them up individually to popular odium, and under this clause [i. e., that relating to official returns of experiments] that could be done.

I hand you here, Mr. Chairman, the second edition of a book entitled "The British Vivisectors' Directory. A Black Book for the United Kingdom," by Benjamin Bryan, with a preface by Frances Power Cobbe, London, 1890.

One sentence from Miss Cobbe's preface will serve to indicate to you a purpose for which the book is compiled. In speaking of experimenters on animals she says:

> Could the older nonscientific men and the tender-hearted women with whom they associate behold for one moment in some magic mirror their employment of a few hours before over their torture troughs, they would be shunned and abhorred as unfit to belong to civilized society.

The book is accompanied with comments full of misrepresentations and sometimes with gross misstatement of facts.[1] It is for you, gentle-

[1] An illustration of the way in which antivivisectionists misrepresent facts is furnished by a book entitled The Nine Circles, which has the name of Miss Cobbe on its title-page, and for which she wrote the preface. At the Church Congress at Folkestone, October, 1892, Mr. Horsley called attention to this book in the following words:

"In the book all the experiments are grouped by Miss Cobbe as English and foreign, respectively. I have taken the trouble to collect from this gospel of Bishop

men, to consider whether you will place in the hands of antivivisectionists the opportunity to issue such appeals as this to elderly nonscientific men and tender-hearted women to ostracize socially a list of physiologists whose names and experiments appear, accompanied by false and misleading statements, in a printed catalogue. It matters not that the list of names is in fact a roll of honor.

I desire now to call your attention with especial emphasis to a question about which more diversity of opinion has been expressed than concerning any other aspect of this bill. Will this bill, if it becomes a law, prohibit important and useful experiments? Its advocates are vehement in their assertion that it is simply "restrictive and not prohibitive," and "concedes everything of utility," and they charge its opponents, who claim that the bill prohibits useful experiments, with misrepresentation or with ignorance of its provisions. The bill has been printed repeatedly in medical journals of this country and has been fully discussed there. The accusation is unwarranted that protests against its enactment, which have been sent in hundreds to Senators and Representatives in Congress by medical and scientific men and societies, are based upon ignorance of the contents of the bill. There can be no doubt as to which side is the more competent to give a correct response to this question—the great body of medical and scientific men who answer it affirmatively, or those practically unfamiliar with animal experimentation and with physiology and medicine, who represent the negative.

I have already pointed out that this bill leaves it entirely to the discretion of two laymen, who constitute the majority of the District Commissioners and who can not be shown to possess any special qualifications to judge of the matter, to determine whether any experiments upon vertebrate animals shall be performed in the District of Columbia. I need not recur here to the partial exemption of officers of the Government from the control of the District Commissioners. I have also shown how the numerous restrictions, such as the quadruply indorsed applications, the licenses, the various special certificates, the registrations of places, the inspections, the demands at any time for reports of methods and results, the specifications as to purposes and conduct of experiments, place it entirely within the power of the administrators of the law seriously to hamper and indeed actually to prevent experimental investigations while nominally permitting them.

But quite aside from these prohibitive effects dependent upon the manner of enforcement of the law, this bill in unmistakable terms expressly prohibits important and useful experiments. The carelessness of construction and the vagueness, whether accidental or inten-

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Barry and Canon Wilberforce all the experiments in which cutting operations are described as having been performed by English scientists and in which I knew anæsthetics to have been employed. These experiments are twenty-six in number. In all of them chloroform, ether, or other anæsthetic agent was employed. But of these twenty-six cases Miss Cobbe does not mention this fact at all in twenty, and only states it without qualification in two out of the remaining six. When we inquire into these twenty omissions in the twenty-six cases, we find in the original that again and again Miss Cobbe has, in making her extracts, had directly under her eyes the words 'chloroform,' 'ether,' 'etherized,' 'chloroformed,' 'anæsthetized,' 'during every experiment the animal has been deeply under the influence of an anæsthetic,' and so forth." (The Standard (London), October 7, 1892.)

Miss Cobbe subsequently explained that the book was "planned and compiled by her direction," but the actual work of compilation was done by another.

tional, of certain provisions of the bill leave it uncertain whether some other useful experiments are forbidden or not.

The only experiments on vertebrate animals permitted by this act are those for "the advancement by new discovery of physiological knowledge or of knowledge which will be useful for saving or prolonging life or alleviating suffering" (section 2 (*a*)), in which experiments "the animal must, during the whole of the experiment, be completely under the influence of ether or chloroform" (section 2 (*c*)). There are four, and only four, exceptions to these requirements, to wit:

(1) "Experiments may be performed under the foregoing provisions as to the use of anæsthetics by a person giving illustrations of lectures in medical schools, hospitals, or colleges, on such certificate being given, as in this act hereafter mentioned, that the proposed experiments are absolutely necessary for the due instruction of the persons to whom such lectures are given, with the view to their acquiring physiological knowledge or knowledge which will be useful to them for saving or prolonging life or alleviating suffering" (section 2 (*e*)); (2) "in so-called inoculation experiments, or (3) tests of drugs or medicines, the animal need not be anæsthetized nor killed afterwards, nor (4) in tests of surgical procedure need animals be kept completely anæsthetized during the process of recovery from the surgical operation" (section 2 (*c*)). I shall not dwell upon the apparent withdrawal of a part of these exceptions in the subsequent paragraph (section 2 (*d*)). The cause of the contradiction between these two paragraphs will be apparent to anyone who will take the trouble to compare this bill with the British act and to note where matter not in the latter has been introduced into the former without regard to the resulting confusion in the sense.

I can not claim familarity with all of the antivivisection bills which have been introduced into legislative bodies; but I should be surprised to learn that there are any, stopping short of total prohibition, which have been more prohibitive in their provisions than this so-called "moderate and reasonable" bill before us. Who was it that in copying the phrases of this bill from the British act struck out bodily the three provisions in the latter permitting certificates to be granted, when the necessities of the investigations demanded, (1) for the performance of experiments without anæsthetics, (2) for the survival of the animal after the operative part of the experiment, and (3) for the performance of experiments "for the purpose of testing a particular former discovery alleged to have been made"? Was it some one who tells us that this bill "goes to the farthest extreme of concession in the anxiety of its framers to yield to the wishes of scientific men so far as may be consistent with the principle of legal supervision"?

Does anyone suppose that the exceptions concerning inoculation experiments, tests of drugs or medicines, and tests of surgical procedure can begin to take the place of all the experiments forbidden by the omission of the provisions mentioned? Misapprehension there may have been as to the effects of this bill, but it has not been on the side of those who have emphasized its prohibitive features.

I could spend the entire time allotted to me in enumerating useful experiments absolutely prohibited by this bill, but it must suffice to call attention to a few of the more important classes of prohibited experiments.

The prohibition of the use of any anæsthetic except ether and chloroform is simply ludicrous and exhibits the folly of those without

knowledge of physiology and medicine attempting to frame laws for the regulation of scientific experimentation on animals. I suppose that this really unmerciful prohibition is based on certain absurd notions current in antivivisectionist literature on the subject of anæsthetics and narcotics. There are not only many volatile substances, besides ether and chloroform, which, when inhaled in sufficient quantity, produce equal insensibility to pain, but among the so-called narcotics there are not a few which, administered in sufficient doses by the mouth, hypodermically, or intravenously, produce complete insensibility to pain, and, what is often of importance, insensibility extending over long periods of time. Anæsthetics and narcotics differ among themselves in their effects on the circulation, respiration, and other functions, and the exigencies of a research may require the use now of one and now of another without introducing any difference in the completeness of the anæsthesia.

The range of choice of anæsthetics for experiments on animals is much larger than for use on human beings, and modes of administration and dosage are often different in the two cases. Especially are the so-called narcotics administered to animals in doses relatively much larger than for human beings, and in ways securing prompter effects. Ether and chloroform are far from being ideal anæsthetics even for man, and it is not at all improbable that some better substitute may be discovered for ordinary use in human practice. Chloretone, which has been recently introduced, may be cited as a narcotic which produces complete anæsthesia and is often more serviceable and, on account of its prolonged effects, more humane for laboratory experiments than ether or chloroform. To forbid the use of local anæsthetics in suitable cases, or indeed to require the administration of an anæsthetic in every painful experiment, except inoculations and tests of drugs or medicines, no matter how slight or how transitory the operation or how low in the scale of vertebrate organization the animal, is really no more merciful to the animal—in fact, it is less so—than a similar requirement would be in human surgery.

There are painful experiments, fortunately very exceptional ones, in which the objects of the experiment would be frustrated by the use of an anæsthetic. Such experiments are permitted under certificates by the British law, but are prohibited by this bill (excepting inoculation experiments and tests of drugs or medicines). When one considers that the discovery of the separate functions of the spinal nerve roots, probably the most fundamental discovery in physiology next to that of the circulation of the blood, is based upon experiments under this category, the possible injury to science which may result from the absolute prohibition of this class of experiments is sufficiently apparent.

Perhaps the largest and most important class of useful experiments prohibited by this bill are those in which the purposes of the investigation require the survival of the animal for periods of time too long for the practicable continuance of the anæsthesia. In only three classes of cases, viz, inoculation experiments, tests of drugs or medicines, and tests of surgical procedure, does the bill permit the experimenter to allow the animal to recover from the influence of the anæsthetic before killing it, provided pain is likely to continue or any serious injury has been inflicted. With these three exceptions all physiological and pathological experiments in which the ends of the experiment can be

attained only by observation of the animal for days or weeks are prohibited by this bill. Such important experiments as those which have shed light upon the processes of digestion by gastric, biliary, pancreatic or intestinal fistula, upon the functions and sounds of the heart by the experimental production of valvular lesions, upon the functions of the brain and spinal cord, of the kidneys, of the thyroid gland, of the liver, and, indeed, of most of the organs of the body by observations extending over some length of time after an experiment, are all prohibited by the conditions of experimentation imposed by this bill.

The list of prohibited experiments of this class is so long that I can not attempt to enumerate them. You inquired, Mr. Chairman, if the experiments upon the brain and upon the liver cited by Dr. Keen as the basis for his successful operations could not be performed under the provisions of this bill. They could not, for they required the survival of the animal after an operation inflicting serious injury, and they were not undertaken as tests of a surgical procedure, but for purely physiological and pathological purposes. Nor does this bill permit such experiments as those cited by Dr. Hare, which have led to the successful treatment of myxœdema and forms of cretinism. If this bill included no more than the provision forbidding the performance of this class of experiments, its enactment would inflict a blow, simply brutal, upon biological and medical science. It is conceivable that the framers of the bill did not know what they were doing when they inserted this prohibitive feature, but that surely does not put the matter in any better light.

It does not seem to me necessary, nor in the limited time is it practicable, to continue with an enumeration of all the useful classes of experiments prohibited by this bill. To some others I have called attention in Senate Document No. 104, Fifty-fifth Congress, second session. I may here say that it is not clear to me what is meant by an assertion repeatedly made by advocates of the bill that inoculation experiments are excluded from its operation. They are subject just as much as any other experiments to all its restrictions, except that the animal need not be anæsthetized during the operation or killed afterwards. The magnitude of the concession that an animal need not be anæsthetized for the prick of a needle or kept unconscious for days or weeks seems to have made an extraordinary impression upon the supporters of this bill.

Much might be said of the inadequacy and vagueness of the provision that, save demonstrative experiments for lectures, all permissible experiments must be for the advancement of two kinds of knowledge by new discovery and of other obscure and doubtful provisions sure to lead to conflicts in interpretation; but enough has been said to demonstrate that this bill explicitly prohibits many experiments of the highest scientific and practical value, including many which involve less suffering to the animal than some that are permitted. These unambiguous prohibitive features of the bill have been pointed out again and again in published documents, but I have never seen any answer vouchsafed to these apparently weighty criticisms, nor do I expect to hear any to-day.

One of the speakers on the other side devoted a large part of his remarks to the subject of vivisection in public schools. The only reply which seems necessary is that the existing law permits only "properly conducted scientific experiments or investigations, which experiments *shall be performed* only under the authority of the faculty of some

regularly incorporated medical college, university, or scientific society," and that the superintendent of public schools, on April 24, 1896, wrote:

> Vivisection has never been practiced in the schools of the District of Columbia, so far as I have been able to ascertain after the most diligent inquiry. No legislation is necessary on this subject, because the authorities of the schools are radically opposed to vivisection except by experts for scientific purposes, and will do everything in their power, without legislation, to prevent its occurrence in the public schools.

There has been copied into this bill from the British law one feature which has always been regarded by scientific men as irrational, namely, the application of the restrictions upon experimentation indiscriminately to all classes of vertebrate animals. The bill originally introduced into Parliament provided that the act should not apply to cold-blooded animals, but, without any appreciation of the enormous practical difference made by the change, the word "invertebrate" was substituted by some politician in Parliament for "cold-blooded," and without discussion the substitution was adopted. We know and can know very little about conscious pain in the lower animals, but there is good reason to believe that the lower the scale of organization of the higher nervous centers the less is the sensibility to pain.

As Lord Lister has said:

> The way in which a salmon pulls when it has taken the fly is as good evidence as any experiment made for the purpose can afford that the sensibility of the tongue and the interior of the throat is altogether different from that of the human subject. Supposing a man were caught by a sharp hook in the tongue or interior of the throat, he could not by any possibility pull, as the salmon does, against the hook; the torture would be so exquisitely great that it would be an impossibility for him to pull in that way. This is one instance; but it seems to me that it is only one among many that might be given which are perfectly conclusive on the matter. (Report of the Royal Commission on Vivisection, p. 216.)

It is manifestly absurd and a serious impediment to certain lines of research to lay down the same rules for the administration of anæsthetics and the survival of the animal after an operation for experiments on tadpoles, snakes, lizards, and frogs as for those on cats, dogs, and horses, and nevertheless this is done in the bill before us.

In looking over the British law upon this subject I was struck by the following provision, which would seem to afford experimenters considerable protection against persecution:

> A prosecution under this act against a licensed person shall not be instituted except with the assent in writing of the secretary of state [the authority administering this law].

I am not a lawyer and can not say whether the omission of a similar safeguard from the present bill is based upon legal grounds, but if not, then I do not care to comment upon the motives of those who copied so much of the British law and left out this valuable protection to physiologists against unjust and malicious prosecutions.

Mr. Chairman, although I have not by any means exhausted the objections to this legislation, and have left untouched a number of just criticisms upon it already presented in various public documents, I see no necessity of occupying more time in a discussion of other objectionable provisions, after the hopelessly defective character of the bill has once been made sufficiently clear. I trust that it has been demonstrated to the satisfaction of this committee that no further legislation upon this subject is necessary; that this law, in attempting to restrain abuses, of whose existence there is no evidence, would do far more harm than by any possibility good, by seriously hampering the work of scientific

investigators; that many of the leading provisions of the bill are monstrously wrong in principle and would be most detrimental in practice to the interests of medicine and biological science; that the proposed law is capable of being administered so as to prevent all animal experimentation, and does in fact explicitly prohibit a large number of important and useful experiments.

Before closing I should like to advert to two points which are pertinent to the discussion of this sort of legislation, viz, its inequality and the experience with similar legislation in Great Britain.

The fact that legislation is class legislation is, I know, not decisive as to its propriety, but it does raise a prejudice, often a justifiable one, against it. Sir John Simon, in his testimony before the Royal Commission on Vivisection, forcibly presented the unequal character of such legislation as that contemplated in this bill. He said:

> You must take this question of physiology with the general social context; and I do this as impartially as I can when I think of projects of legislation in the present matter.
>
> I take up, for instance, one of these bills, and I find this:
>
> "Whereas it is expedient to prevent cruelty and abuse in the experiments made on living animals for the purpose of promoting discoveries in the sciences of medicine, surgery, and physiology." * * *
>
> Do you suppose that one of Magendie's experiments—the worst of them—is more cruel to the sufferer of it than hare hunting to the individual hare or fox hunting to the individual fox? And is animal life less to be protected against "cruelty" when the life is sacrificed for purposes of sport than when it is sacrificed for purposes of science? You are proposing that physiologists shall be treated as a dangerous class; that they shall be licensed and regulated like publicans and prostitutes. What I would venture to put before you is that this would be fancy legislation, touching the relations of man to the lower animals at a little bit—and a comparatively unimportant little bit—of the subject-matter, and that society would come to such legislation with unclean hands.
>
> Who is the accuser of the physiologist? Society assumes a universal right to slaughter animals for its food, to cut their throats and wring their necks at its discretion, and neither stints its luxury (much less its hunger) in reluctance to take life, nor troubles itself much about painless methods of killing. To kill particular animals in particular ways is a considerable branch of national amusement, and the wealthy breed certain animals on a large scale exclusively to have sport in killing them, and, for the unpracticed, often to mangle where they do not kill. Also, with a view to slaughter, or with a view to other service, society inflicts sexual mutilation on nearly all the males of the cattle, horses, sheep, and swine which it controls, and, as to swine, on many of the females. You never eat a mutton chop that does not come from an emasculated sheep; you rarely use a male horse that has not had its testicles cut out.
>
> Now, when the common habit of society treats domestic animals in this way, slaughtering and mutilating them at its will for use, for convenience, for luxury, and while battues and wager slaughtering and hare hunting are elements of national sport, it seems altogether monstrous to put into a separate category the extremely small use which physiology (for great human interests) makes of the lives of brute animals, and to have as the preamble of a bill that cruelty is to be prevented in that one relation while all other relations are to be left loose.

We have no opportunity to judge from actual experience of the practical results of vivisection legislation so restrictive and so unintelligent as that in this bill. The experience, however, for the last quarter century in Great Britain, the only country which has hitherto introduced legislation of this character, should be quite sufficient to warn lawmakers elsewhere against the adoption of all such legislative proposals; and it is the strongest incentive to scientific and medical men in other countries to resist to the utmost the imposition of similar shackles upon freedom of scientific investigation.

The bill before us was copied in its main features from the British law, although, as I have pointed out, with restrictive additions and with the omission of important concessions and safeguards. The British law, although, unlike this bill, not prohibitive of any important kinds of experiment, surrounds the practice of animal experimentation with severe and harsh restrictions, and has been rigorously enforced. That it has not crushed the life out of British physiology and experimental medicine is evidence of their inherent vitality and of the indomitable energy of scientific workers in that land. Of its harmful effects I shall bring testimony presently.

The law was enacted by Parliament avowedly to satisfy public clamor. Lord Sherbrooke (then the Right Hon. Robert Lowe) has correctly characterized in the following words the report of the royal commission which was appointed to inquire into the existence of abuses of vivisection:

> The commission entirely acquitted English physiologists of the charge of cruelty. They pronounced a well-merited eulogium on the humanity of the medical profession in England. They pointed out that medical students were extremely sensitive to the infliction of pain upon animals, and that the feeling of the public at large was penetrated by the same sentiment. They then proceeded to consider to what restrictions they should subject the humane and excellent persons in whose favor they had so decidedly reported. Their proceeding was very singular. They acquitted the accused, and sentenced them to be under the surveillance of the police for life.

Unfortunately physicians and scientists in England at the time made no such determined opposition against the proposed legislation as their colleagues are doing in this country in the case of the present bill. Many of them believed that acquiescence would put a stop to the mischievous agitation of antivivisectionists who, as the royal commission showed, had misled a considerable section of the public to credit their ex parte statements concerning the existence of serious abuses.

In this belief our English brethren were grievously mistaken, and they have earnestly warned us not to fall into their error. This legislation has in no measure accomplished its avowed purpose to afford an antidote to unjust suspicions. As Dr. Bowditch has told you, and as all familiar with their ultimate aims know, the antivivisectionists, in deference to whose wishes the British law was enacted, are not in the least satisfied with its operations and are clamoring for total prohibition. You will have no better success if you defer to their immediate desires as regards this bill, while you may be assured that its passage will encounter the hostility of the entire medical profession of this country and will inflict grievous injury upon medical science and art. The truth is that this legislation is directed against a phantom, and the phantom will not be exorcised by any measure which stops short of the total prohibition of all animal experimentation, perhaps not even then.

Out of a considerable number of letters upon this subject from English physicians, all to the same general purport, I have selected four on account of their weight of authority, which should convince you of the injury to scientific and practical medicine inflicted by the British law. The first letter which I shall read is from Lord Lister, president of the Royal Society, a name immortal in the annals of medicine, one of the greatest benefactors of mankind through his discovery and introduction of the principles of antiseptic surgery. It was written in 1898 and addressed to Dr. Keen.

LETTER OF LORD LISTER.

MY DEAR SIR: I am grieved to learn that there should be even a remote chance of the legislature of any State in the Union passing a bill for regulating experiments upon animals.

It is only comparatively recently in the world's history that the gross darkness of empiricism has given place to more and more scientific practice, and this result has been mainly due to experiments upon living animals. It was to these that Harvey was in large measure indebted for the fundamental discovery of the circulation of the blood, and the great American triumph of general anæsthesia was greatly promoted by them. Advancing knowledge has shown more and more that the bodies of the lower animals are essentially similar to our own in their intimate structure and functions, so that lessons learned from them may be applied to human pathology and treatment. If we refuse to avail ourselves of this means of acquiring increased acquaintance with the working of that marvelously complex machine, the animal body, we must either be content to remain at an absolute standstill or return to the fearful haphazard ways of testing new remedies upon human patients in the first instance which prevailed in the dark ages.

Never was there a time when the advantages that may accrue to man from investigations on the lower animals were more conspicuous than now. The enormous advances that have been made in our knowledge of the nature and treatment of disease of late years have been essentially due to work of this kind.

The importance of such investigations was fully recognized by the commissioners, on whose report the act of Parliament regulating experiments on animals in this country was passed, their object in recommending legislation being professedly only to prevent possible abuse. In reality, as one of the commissioners, the late Mr. Erichson, informed me, no single instance of such abuse having occurred in the British Islands had been brought before them at the time when I gave my evidence, and that was toward the close of their sittings.

Yet in obedience to popular outcry the Government of the day passed an act which went much further than the recommendations of the commissioners. They had advised that the operation of the law should be restricted to experiments upon warm-blooded animals, but when the bill was considered in the House of Commons a member who was greatly respected as a politician, but entirely ignorant of the subject-matter, suggested that "vertebrated" should be substituted for "warm-blooded," and this amendment was accepted by a majority as ignorant as himself.

The result is that, incredible as it may seem, anyone would now be liable to criminal prosecution in this country who should observe the circulation of the blood in a frog's foot under the microscope without having obtained a license for the experiment, and unless he performed it in a specially licensed place.

It can be readily understood that such restrictions must seriously interfere with legitimate researches. Indeed, for the private practitioner they are almost prohibitive, and no one can tell how much valuable work is thus prevented.

My own first investigations of any importance were a study of the process of inflammation in the transparent web of the frog's foot. The experiments were very numerous, and were performed at all hours of the day in my own house. I was then a young, unknown practitioner, and if the present law had been in existence, it might have been difficult for me to obtain the requisite licenses; and even if I got them it would have been impossible for me to have gone to a public laboratory to work. Yet without these early researches, which the existing law would have prevented, I could not have found my way among the perplexing difficulties which beset me in developing the antiseptic system of treatment in surgery.

In the course of my antiseptic work at a later period I frequently had recourse to experiments on animals. One of these occurs to me which yielded particularly valuable results, but which I certainly should not have done if the present law had been in force. It had reference to the behavior of a thread composed of animal tissue applied antiseptically for tying an arterial trunk. I had prepared a ligature of such material at a house where I was spending a few days at a distance from home, and it occurred to me to test it upon the carotid artery of a calf. Acting on the spur of the moment, I procured the needful animal at a neighboring market, a lay friend gave chloroform, and another assisted at the operation. Four weeks later the calf was killed and its neck was sent to me. On my dissecting it the beautiful truth was revealed that the dead material of the thread, instead of being thrown off by suppuration, had been replaced, under the new aseptic conditions, by a firm ring of living fibrous tissue, the old dangers of such an operation being completely obviated.

I have referred thus to my personal experience because requested to do so, and these examples are perhaps sufficient to illustrate the impediments which the exist-

ing law places in the way of research by medical men engaged in practice, whose ideas, if developed, would often be the most fruitful in beneficent results.

But even those who are specialists in physiology or pathology, and have ready access to research laboratories, find their work very seriously hampered by the necessity of applying for licenses for all investigations and the difficulty and delay often encountered in obtaining them.

Our law on this subject should never have been passed and ought to be repealed. It serves no good purpose and interferes seriously with inquiries which are of paramount importance to mankind. Believe me,

Sincerely, yours, LISTER.

The second letter is from Sir Thomas Grainger Stewart, professor of medicine in the University of Edinburgh, physician to the Queen, formerly president of the Royal College of Physicians, of Edinburgh, and of the British Medical Association. The name of no British physician is more widely known and honored both in his own country and in America than that of Grainger Stewart, whose death occurred within the present month. The following letter was written in 1898:

LETTER OF SIR THOMAS GRAINGER STEWART.

MY DEAR DR. KEEN: I much regret to hear that you are threatened with the kind of legislation which has in this country proved so detrimental to all branches of physiological and pathological science and consequently to practical medicine and surgery.

It may have been true, as the antivivisectionists of this country asserted, that cruelty was inflicted upon the lower animals for purposes of experiment and demonstration, but I can certainly vouch for it that I never saw anything of the kind, and I have been closely connected with the work of some of our chief medical schools ever since my graduation nearly forty years ago.

But I do know of my own experience that the laws passed in the interests of antivivisection have proved a great hindrance to original research among us—not that experiment is forbidden, for competent men can, as a rule, get permission; but the restrictions, the delays, the formalities that have to be gone through, are so irksome as to hinder many competent men from undertaking researches, and to make it almost impossible for such workers as are actively engaged in practice to attempt elucidating research on any special occasion that emerges.

I earnestly trust that a country which loves freedom as your country does, and which has during my professional lifetime made such enormous strides in advance as your country has, will not follow ours in adopting unfair and trammeling restrictions and checking the great career which American medicine has of late years been pursuing.

With much regard, I am, yours, very truly,

T. GRAINGER STEWART.

The next letter, also written in 1898, is from Dr. T. Lauder Brunton, physician to St. Bartholomew's Hospital, London, a physician of great eminence, and author of the most scientific and authoritative text-book on pharmacology and therapeutics in the English language.

LETTER OF DR. T. LAUDER BRUNTON.

DEAR DR. WELCH: I regret extremely to hear that there is a movement in America to stop the progress of medicine by prohibiting experimentation upon animals. Those who have set this agitation on foot are no doubt well-meaning, but in their anxiety to prevent pain to the lower animals they are entirely forgetful of the consequences to man. It is through experimentation on animals that medicine and surgery have made such enormous strides of recent years, so that we are able to prevent the spread of infective diseases, to lessen mortality in such diseases as diphtheria, to relieve pain and induce sleep in ways that were unthought of thirty years ago, and to perform surgical operations on the abdomen which are now becoming so common because they are so free of risk, whereas formerly such operations entailed the almost certain death of the patient.

The good-hearted, but sentimental and mischievous persons who oppose experiments upon animals forget that animals as well as men must die, and that the natu

ral end to which all these animals would come is probably much more painful than death at the hand of the physiologist. It is a want of conception of the importance of experimentation in increasing the power of the medical man to relieve pain and prevent death that causes sentimentalists to oppose it. As an illustration of this I may mention that shortly after the antivivisection act was brought into force in England, Sir Joseph Fayrer and I were prevented from carrying on, at our own expense, experiments on the action of snake poison and the best way of preventing death from it. This was done because snakes were almost unknown in this country and death from their bite is almost unheard of. But at the very moment that we were prevented from doing the experiments here the Government of India, knowing the importance of the research, as 20,000 people die yearly from the bite of poisonous snakes in India, appointed their own officials, paying them salaries and providing them with all facilities to carry on the research in India which the Government at home was preventing Sir Joseph Fayrer and me from doing at our own expense.

The Indian government realized the danger of death from snake bite, while the home Government did not, and consequently the Indian government forwarded the research in order to prevent the suffering and death of its subjects, while the home Government was prohibiting such a research. It was the ignorance of the home Government which led it to do this; it was the knowledge of the Indian government which led it to act as it did.

In America the ignorant and prejudiced will be sure to take up the antivivisection cry, while the wise and truly benevolent will oppose the bill. The passage of the antivivisection act in this country has interfered to an enormous extent with physiological work, and in order to do some of my investigations, the object of which was simply to find out what the action of certain medicines was that one might apply them to the relief of suffering mankind, I have been obliged to go to Paris to carry on my research in a foreign laboratory. It will be a great blow to the progress of the science of medicine in America if any such act is passed, because it will be much more difficult for American scientists to go to foreign countries in order to do their experiments than it is for men living in England.

I trust that the good sense of the American people will prevent any such act being passed, and I consider it the bounden duty of all American medical men who have the interests of their profession and patients at heart to oppose to the very utmost and by every means in their power the passage of any such act.

Believe me, faithfully yours,

T. LAUDER BRUNTON.

The last letter is from Sir Michael Foster, member of Parliament, professor of physiology in the University of Cambridge, secretary of the Royal Society, the most distinguished physiologist of Great Britain, and one of the most distinguished in the world. No one can speak with fuller practical knowledge of the workings of the British antivivisection law than Professor Foster. The letter was written in 1890 and addressed to Professor Hodge, of Clark University, Worcester, Mass.

LETTER OF SIR MICHAEL FOSTER.

MY DEAR SIR: It is not easy to estimate accurately the effect of the vivisection act in Great Britain. Undoubtedly during the period which has elapsed since it was passed there has been more, much more, physiological work than in a like period before the act; and, on a principle not unknown to the founders of New England—viz, that persecution and difficulties engender zeal—we may look upon some of this as an unintended effect of a "penal measure" (for so the law lords spoke of it in the House of Lords when it was being passed). On the other hand, we can only conjecture what work might have been had no such act been passed. Turning to the actual experience, one can say that not only great annoyance, which is a very little matter, but great delay and loss of time, which is a very serious matter, have been experienced in researches which have been allowed, and quite apart from researches which have been actually forbidden by refusal of certificates and licenses.

Many researches have been abandoned or let alone which would have been undertaken had there been no act. We all work on a ticket of leave. Some work is prevented because the opportunity for work comes suddenly, unexpectedly, and before the ticket can be got the opportunity has passed; for, though the officials do their best, I believe, to prevent unnecessary delay, a good deal of delay can not be avoided. Again, a man undertakes a research for which he gets his ticket, but the development

of his research suggests experiments not provided for in his ticket; he has to wait until his ticket is amended, or until he gets a new ticket, and while he is kicking his heels waiting for a new permission the spirit leaves him. Again, there are some experiments for which it is hopeless, or almost hopeless, to expect to get permission, and the investigator is obliged to leave his research incomplete, or, if he can, go abroad to complete it. There are several instances known to me where men have gone abroad to do what is forbidden at home, and I believe that such instances are by no means uncommon. The authorities I believe do their best to administer the act justly, but they are laymen, not understanding the nature of physiological research, and, moreover, are politicians, having to defend their actions in the House of Commons before a clamorous and active faction of opponents to science.

I have just said that men go out of England to do particular experiments, and undoubtedly the act prevents men staying in England or coming to England to carry on research requiring vivisection, at least of the kind requiring special certificates. For instance, I myself can in my laboratory only offer facilities for research within the limits and under the difficulties of the act. No one in his senses who could go elsewhere would come to me to do imperfectly and under the great disadvantages what he could do freely and without hindrance elsewhere. I believe that had it not been for the act we should have had many more men coming to work in our laboratories than we have.

I have always said and always shall say that the necessity of a restrictive law has never been shown. The English commission failed to demonstrate any abuse such as could justify the measures adopted, and from what I know of America and Americans I am confident that no such laws are needed with you. Indeed, my objections to the act as a politician are quite as strong as my objections as a physiologist; the act is stamped with that mark of bad statesmanship, meddlesomeness.

The effect of such an act with you would be, I imagine, much as with us. It would not stop physiological work; it would worry it; it would prevent many important researches being made complete; it would lead men to follow out, not the lines of research to which their ideas led them, but those which they could pursue without the restraints of licenses and certificates; it would, as with us, almost destroy the researches carried on by private individuals, working apart from established laboratories, and would certainly largely curtail the usefulness of Clark University by increasing the tendency, which you will always have to strive against, toward the predominance of pedagogy over pure research.

The act took birth in England (1) from the energy of doctrinaires of the upper middle class (the upper ten thousand had nothing to do with it), who had time and funds for public agitation, while men of science and doctors had something else to do and hated agitation. (2) Because certain leaders in science and medicine, fearing the strength of the doctrinaries, advised a compromise (the compromise has proved to be one-sided). "The report of the commission went beyond the evidence and the bill went beyond the report;" further, some most objectionable features were added to the bill as it was being passed through Parliament at the end of a session. If the act had confined itself simply to demanding that no one should perform experiments who had not received a general license to do so, comparatively little harm had been done; it is the special certificates for particular kinds of experiments which give really all the trouble.

But if the time were to come over again, I would fight tooth and nail against any act at all, on the ground that all such legislative restrictions are unnecessary; that instances of cruelty—that is, of heedless causing of pain on the part of physiologists—are, to say the least, rare, and that public opinion aided by the ordinary law, is quite sufficient to cope with such cases. (I of course assume that vivisection is absolutely necessary for the progress of physiology.) And much as I hate public agitation, I should throw myself with all the energy I possess into agitating against such measures, sacrificing my little portion of present science for the sake of science to come. My advice to you is, accept no compromise whatever; refuse to admit for a moment the need of such a law, and fight against it everywhere, in the newspapers and on the platform, and, if the situation demands it, even imitate your opponents and refuse a political vote to a candidate who will not pledge himslf to vote against it. I don't think I can say anything stronger than this last. To repeal a law is a very different thing from opposing the making of one. I scarcely think that I shall live to see the repeal of our act, but if the chance of success ever offers itself I trust I should be ready to carry out for ourselves the advice which I am now giving you.

Yours, very truly,

M. FOSTER.

Such are the opinions, based upon actual experience, of the foremost representatives of English surgery, medicine, therapeutics, and physiology, upon the effects of the only antivivisection law in operation in any country—a law, moreover, bad enough, but still far less repressive than that embodied in this bill. Can you wonder that biologists and physicians throughout this country are so earnest and active in their efforts to prevent the enactment of this bill? The opportunity which the introduction of this bill into Congress has afforded for an expression of the real sentiments of scientific and medical men has served to show the falsity of the assertion current in antivivisectionist writings that there is any material division of opinion in the medical profession concerning the utility of vivisection and the dangers to science inherent in this kind of legislation.

I am aware that lists of doctors are reported in antivivisectionist publications purporting to show that many physicians are opposed to vivisection or approve special restrictive legislation. These lists, so far as published with any fullness, contain many names which will not bear scrutiny as to their professional standing. In the most frequently cited of these lists—that collected by the American Humane Society in 1894–95—I do not see how any right-thinking person could approve the statement headed "Vivisection without restrictions," which is as follows:

> Vivisection, or experimentation upon living creatures, must be looked at simply as a method of studying the phenomena of life. With it morality has nothing to do. It should be subject neither to criticism, supervision, nor restrictions of any kind. It may be used to any extent desired by any experimenter (no matter what degree of extreme or prolonged pain it may involve) for demonstration before students of the statements contained in their text-books as an aid to memory, for confirmation of theories, for original research, or for any conceivable purpose of investigation into vital phenomena. We consider that sentiment has no place in the physiological laboratory; that animals have there no "rights" which man is called upon to notice or respect. * * *

The comparatively small number of names signed, I must believe without due consideration, to this sorry, yes infamous, stuff is adduced by antivivisectionists as representing the proper ratio of physicians opposed to such legislative restrictions as we are considering, while the large number of those who refused to sign it is cited in support of this restrictive legislation. Could anything be more unfair?

I know no one, certainly no scientific man, who believes in vivisection unrestricted by morality, uninfluenced by judicious criticism and public opinion, without competent supervision, without regard for a serious purpose in making the experiment, without due care in the avoidance of unnecessary suffering, and without subjection to the statute law relating in general to the prevention of cruelty to animals. These are the restrictions which should and do control the practice of animal experimentation. No further legislation is needed to secure them, and no special legislation regulative of this practice has ever been suggested which would not seriously interfere with useful and proper experimentation, and therefore prove detrimental to the interests of medical science and art.

Surprise has been expressed that scientific men and the great body of the medical profession in all parts of this country should concern themselves so actively with contemplated legislation which in its immediate effects relates to a very limited area and affects directly the work

of probably not more than a dozen men, if indeed of that number. Our solicitude to prevent the passage of this act is not greater than that of antivivisectionists throughout the country to secure it. Our opponents have hitherto signally failed in their repeated efforts to obtain the enactment of similar laws in the various States. They now seek Congressional sanction in the hope that it will promote their cause throughout the country. We know, and scientific and medical men alone can fully know, the dangers to science and humanity which lurk in what may seem to some of you this unimportant bit of legislation.

The medical and biological sciences have advanced in these later years with strides unapproached and in directions undreamed of but a quarter of a century ago. New vistas of knowledge and power have been disclosed, the full fruits of which will be gathered by coming generations. The main cause of this unparalleled progress in physiology, pathology, medicine, and surgery has been the fruitful application of the experimental method of research, just the same method which has been the great lever of all scientific advance in modern times. Strange as it may seem, at the turning point of the century we are here, not as we should be, to ask you to foster and encourage scientific progress, but to beg you simply not to put legislative checks in its way. Our own contributions to this progress may now be small, but America is destined to take a place in this forward movement commensurate with her size and importance. We to-day should be recreant to a great trust did we not do all in our power to protect our successors from the imposition of these trammels upon freedom of research. Our appeal to you is not only in the name of science, but, in the truest and widest sense, in the name of humanity.

Senator GALLINGER. I would like to ask a question concerning the English law. I think that Professor Bowditch said to-day that it was inoperative and that it did not really have any potency.

Dr. BOWDITCH. I did not say that, Mr. Chairman, but that that was what the antivivisectionists said. I stated that they have not been satisfied with the way it was enforced.

Senator GALLINGER. I think Dr. Keen said that Dr. Kober had a paper he would like to present.

Dr. KEEN. Yes; and I received to-day from Prof. Roswell Park, professor at the University of Buffalo, N. Y., a letter which he asked me to present, containing suggestions which he would present if here in person. I should like it to go into the record.

Senator GALLINGER. There is no objection.

The paper of Dr. Kober is as follows:

PROTEST FROM THE CIVIC CENTER, WASHINGTON, D. C., AGAINST THE PASSAGE OF SENATE BILL NO. 34, PROVIDING FOR THE FURTHER PREVENTION OF CRUELTY TO ANIMALS.

[A review of the evidence and reports heretofore presented, prepared by George M. Kober, M. D., chairman of the committee on public health, Civic Center, Washington, D. C.]

Gentlemen of the Committee:

I am instructed by the Civic Center of this city, a "a nonpartisan organization for the promotion of the public good," to enter a respectful but emphatic protest against the passage of Senate bill No. 34, providing for the further prevention of cruelty to animals in the

District of Columbia, for the reason that a careful examination by our efficient health officer of the law now in force shows that the provisions are ample and sufficient to accomplish all that is laudable in the purposes of the advocates of the bill, and until it is clearly shown that the current law is inadequate for the detection and punishment of unnecessary cruelty it seems presumptuous to occupy your valuable time year after year with the presentation of facts and arguments for and against this measure.

SCOPE OF THE PRESENT LAW.

As we understand the case, under the current law, enacted in 1871, or twenty-nine years ago, the members of the Washington Humane Society have extreme power relative to the search of private premises in which there is reason to believe animals are being needlessly tortured; that it is not only the privilege, but also the duty, of every member of that society, as well as of every peace officer, to enforce the law against such offenses, and that members of the Washington Humane Society are offered a special inducement to perform their duty by reason of the fact that all fines and forfeitures become the property of their society; and, finally, that any person undertaking to perform experiments involving suffering on the part of any of the lower animals is protected from punishment only when such experiments are performed under the authority of some regularly incorporated medical college, university, or scientific society, and even then only as long as they are properly conducted.

If this interpretation of the law by the health officer is sustained—and we see no reason to question his interpretation—the existing law is broad enough to accomplish the purpose. If, on the other hand, it is claimed that the present law is defective and inoperative, the burden of proof for additional legislation clearly rests with the advocates of this measure, and should emanate from unbiased sources and consist of more than the mere opinion of Messrs. Pratt, Perry, Kennedy, and other representatives of the Washington Humane Society; technically, the proper way for obtaining such an opinion would appear to be by the presentation of a specific case to the prosecuting attorney and his refusal to institute proceedings because of the insufficiency of the present law, or by the presentation of a specific case to the court and its dismissal by the court for the same reason.

IS THERE A REAL NEED FOR ADDITIONAL LEGISLATION?

The answer to this question may be found in the fact that the Washington Humane Society, clothed with extraordinary powers, has failed to demonstrate during the past twenty-nine years a single instance of those abuses which Senate bill No. 34 is expected to prevent. If this be true, it is fair to assume that the evils complained of do not exist, or that the members of that society have been derelict in their duty. The writer is unwilling to accept the latter explanation, since the members of the society have shown marked zeal not only by their persistent efforts year after year in pressing this so-called "antivivisection bill," but also by their indefatigable efforts to collect and present evidence in favor of the bill. For this purpose the files of newspapers,

periodicals, medical journals, and the reports of the British royal commission on vivisection have been searched, but

A MOST CAREFUL SCRUTINY OF THE EVIDENCE FAILS TO REVEAL A SINGLE INSTANCE OF CRUELTY TO ANIMALS COMMITTED IN THE DISTRICT OF COLUMBIA.

It is true the advocates of the bill have referred repeatedly to cases of cruelty alleged to have been witnessed by Dr. L. E. Rauterberg at the Army Medical Museum (see his letter, pp. 147 and 148, read before the committee, Senate Report No. 1049, Fifty-fourth Congress, first session), but it is also true that Surgeon-General Sternberg, in a letter to Senator Gallinger, April 20, 1896 (p. 22, Senate Doc. No. 31, Fifty-fourth Congress, second session), requested that Dr. Rauterberg be called upon to specify the names of the individuals who performed the alleged cruel experiments, so that the matter might be investigated, and so far this request had not been complied with.

On the other hand we have the evidence of Dr. John S. Billings and Dr. J. C. McConnell (pp. 22 and 23, Senate Doc. No. 31), showing that Dr. Rauterberg, although a clerk in the Army Medical Museum, was not in any manner connected, as he asserts, with the microscopical division of the museum, and that no such experiments or mutilations were ever made or performed in the Army Medical Museum. In the face of such evidence it is a matter of deep surprise that Mr. A. S. Pratt, president of the Washington Humane Society, should again refer to this charge, and it is equally surprising that if Dr. Rauterberg really observed those cruelties he should fail to specify the facts, as requested to do by Surgeon-General Sternberg. In view of the flat contradiction of his statement by such men as Dr. Billings and Dr. McConnell, who were in a position to know the facts, Dr. Rauterberg owes it to himself and the friends of the antivivisection bill to comply with the Surgeon-General's request. This is all the more important since the opponents of the bill declare:

"Certainly the unverified statement of Dr. Rauterberg is a very inadequate foundation upon which to demand legislation by the Congress of the United States. * * * We believe that restrictive legislation is unnecessary and opposed to the continued progress of medical science, and contend that it is an unjust reflection on the humanity of those engaged in animal experiments to enact laws requiring them to use anæsthetics and appointing inspectors to see that they do so, unless it shall be shown by an impartial investigation that cruel and unnecessary experiments are being performed in the District of Columbia, and that existing laws do not provide suitable punishment for cruelty to the domestic animals."

In the face of this fair challenge for proof upon a question of vital importance, the Washington Humane Society, instead of fortifying Dr. Rauterberg's statements by facts, adduces instances of cruel experiments made, not in this city, nor in the United States, but by Mantegazza, Goltz, and others in Europe. Whatever may be said of the merits of these isolated instances in which the former, not perhaps without a lesson for even well-meaning persons, contributed to our knowledge of the physiology of pain, and the latter to that of maternal instincts, the question confronts us.

IF THE ABUSES WHICH THIS BILL IS INTENDED TO CORRECT REALLY EXIST IN THIS DISTRICT, WHY HAVE THEY NOT BEEN BROUGHT TO LIGHT AND PUNISHED UNDER THE PROVISIONS OF THE EXISTING LAW?

As a matter of fact, we seriously question the existence of such abuses in this city. There are here not less than four medical schools and four universities, besides several scientific bureaus of the Government engaged in biologic research, and if the experiments were not conducted upon humane principles, this should be known, for the results and methods of these experiments are published with full details, and it is untrue, as has been alleged, that secrecy surrounds this practice.

The writer cherishes the highest regard for the humane instincts of the American investigator, who is essentially a practical man, and does not waste his time and money with the repetition of useless experiments, but occupies himself with the solution of problems calculated to be of practical benefit to his fellow-man; and who rightly asserts "that the discoveries already made warrant the claim that human suffering is to be mitigated and human life greatly prolonged through the instrumentality of experimentation upon the lower animals" (p. 3, Senate Report No. 1049, Fifty-fourth Congress, first session), and in support of this claim points with pride to the essay on "Vivisection," a statement in behalf of science (pp. 57–87, Report No. 1049), and to similar evidence presented in the various public documents of the Senate.

IS THIS EVIDENCE SUSTAINED BY THE FACTS? HAS HUMAN SUFFERING BEEN MITIGATED AND HUMAN LIFE GREATLY PROLONGED BY EXPERIMENTATION UPON THE LOWER ANIMALS?

In support of this claim we beg leave to submit that, according to Professor Finkelnburg, of Bonn, the average length of human life in the sixteenth century was only 18–20 years. William R. Thayer, the editor of Harvard Graduates' Magazine, in an article on longevity and degeneration, in the Forum for February, 1900, tells us that during the past one hundred years the length of life of the average man in the United States and in the more civilized parts of Europe has increased from a little over thirty to about forty years, and mentions among the evident means by which this has been accomplished the following: "(1) Whatever may be included under the general term sanitation; (2) improved methods in medicine, and (3) the more regular habits of living which are the direct outcome of industrial life on a large scale."

We are aware Senate Report No. 1049, page 3, maintains, "on the other hand multitudes of educated, humane physicians, who have learned by patient research and large experience the value of other methods to secure the same results, deny that any real advances have been made in medical knowledge in the laboratory of the biologist, while at the same time they deprecate and denounce the cruelties inflicted upon dumb animals by vivisectionists."

Let us briefly inquire into the merits of this statement. Medicine is as old, perhaps, as the human race; yet all the collective research and experience of centuries utterly failed to account for the death-dealing epidemics which swept repeatedly over the face of the globe. According to Hecker, the bubonic or oriental plague, a disease recog-

nized and described as early as the third century B. C., carried off one-fourth of the population of Europe, or 25,000,000 persons, during the fourteenth century alone; and as late as 1664–1665 London, then a city of 460,000 inhabitants, out of whom two-thirds are supposed to have fled to escape contagion, lost 68,956 victims (Wyman) from this disease.

The unsuccessful search for the true cause and the lamentable state of ignorance is clearly shown when we remember that the majority of the people regarded this disease as the dispensation of God's providence, an evidence of Divine wrath which they hoped to allay by all sorts of self-inflicted punishments, and the passion plays of Oberammergau and elsewhere originated about this time. Others accused the Jews of being the cause, and hundreds were burned at the stake until Pope Urban IV placed them under his special protection. The faculty of Paris attributed the epidemic to the conjunction of planets on a certain day in 1345, and the faculty of Leipzig, with equal gravity, asserted that it was connected with earthquakes, unseen waves of air, locust pests, inundations, etc.

We know now, and we have only known it since 1894, that the real cause of this most dreaded of all pestilences is a living germ, capable of reproduction within and without the body. As a result of this discovery a vaccine capable of affording protection against the bubonic plague has been discovered, and it is now in our power to recognize the first cases of plague which may appear in a community and to institute at this early period effective measures of prevention. We also know the specific cause of Asiatic cholera and of many other of the infectious diseases, and the means to prevent their spread by efficient germicides are matters of scientific certainty. But all this knowledge is the result of experiments upon the lower animals, and could never have been gained by centuries of groping after facts.

Dr. Leffingwell, a prominent advocate of the bill, referred rather depreciatingly to the remarks of Dr. Busey, the venerable president of the Medical Society of the District of Columbia, upon the subject of—

TYPHOID FEVER: ITS CAUSE, PREVENTION, AND TREATMENT.

This disease is doubtless as old as the bubonic plague, yet in spite of centuries of "patient research and large experience" it was confounded, until 1830, with typhus fever, and not until 1883, when Eberth discovered the specific germ, did we know the real cause of typhoid fever.

Surgeon-General Wyman, of the Marine-Hospital Service, from statistics received in his office, estimates that there are no fewer than 45,000 deaths caused annually by typhoid fever alone throughout the United States, and, based upon an estimated mortality of 10 per cent, it is within reason to assume an annual prevalence of 450,000 cases. The average duration of a case of typhoid fever is not less than thirty days. If we calculate that an average of $1 is expended per day for care, treatment, and loss of work, and that the value of a human life is $5,000, we have a total loss in the United States of $238,500,000 per annum from one of the so-called preventable diseases. We speak of this disease as a preventable disease, and you will ask with the Prince of Wales in his opening address before the International Congress of Hygiene held in London in 1891—

"*If certain diseases are preventable why are they not prevented?*" And our answer is, that while every scientific physician familiar with biologic research knows full well that if the methods of prevention recommended by sanitarians including the prompt disinfection of the dejecta of every typhoid fever patient were adopted this disease would be reduced to a minimum and probably eradicated in the course of a few years. The facts are that these recommendations have not been generally adopted, especially in this country, because the knowledge gained by experimental medicine is not sufficiently diffused, even among physicians. Senate Report 1049, page 7, informs us, "that out of 1,239 replies from physicians in New York and Massachusetts to an inquiry made by the American Humane Association in 1895, 28 were evasive, 243 were in favor of unlimited vivisection, and 968 were against it."

While we are left in ignorance as to the number of the inquiries sent out, and the nature of replies classed as evasive, these figures, if accepted as representing the opinion of the profession on the utility of experimental medicine, would indicate that about one-fifth of the physicians would insist upon scientific methods of disinfection. But what will this amount to when it is known that a typhoid fever epidemic at Plymouth, Pa., in 1885, affecting over 1,100 persons, was caused by the contamination of the water supply with the dejecta of a single patient.

If any unprejudiced person will, however, examine the wording of the inquiries to which these answers were given, he will see that the one relating to "vivisection without restrictions" is so framed as not to express the sentiments of those who oppose such legislation as that contemplated by this bill, and that the inquiry headed "Vivisection restricted by utility" comes much nearer to such an expression, and among the list of names of those signing this latter inquiry are unquestionably many who condemn the kind and measure of restriction provided for in this bill. There can be no doubt that the great body of medical and scientific men of this country are opposed to this legislation, as is shown by hundreds of published protests from medical and scientific societies, and from individuals.

TUBERCULOSIS IS LIKEWISE A COMMUNICABLE AND TO A GREAT EXTENT A PREVENTABLE DISEASE.

About one-seventh of all the deaths are due to this disease in some form or other, and yet how many physicians are there to-day who institute a crusade against this great white plague in the way of an intelligent and well-directed prophylaxis? If they do not, it is simply because only a small percentage of physicians have grasped the full meaning of the infectious character of the disease and how to prevent its spread. This is not surprising in the face of the fact that the specific cause of this disease was only demonstrated by Koch in 1881–82, and the question of prevention must therefore be largely left to the coming generation of physicians and legislators.

THE VALUE OF KOCH'S TUBERCULIN.

Senate report No. 1049, page 5, refers to an address of Professor Parvin, delivered in this city May 4, 1891, in which he declared, in speaking of Koch's alleged cure for tuberculosis and Pasteur's preventive inoculations:

"It is not beyond the bounds of possibility that before many years *the average results* from antihydrophobic and antituberculous inocu-

lations will be of such an unfavorable character that they will give one of the strongest arguments against vivisection."

The report continues: "This was spoken in 1891, and it is instructive to recall the fact that the 'antituberculous inoculations of Koch over which the medical profession literally lost its head, were long ago relegated to the tomb of forgotten things.' Just how soon other of the great triumphs of vivisection will share the same fate time alone can tell."

In this connection it may be of interest to quote from a recent editorial in the New York Medical Record, January 27, 1900, page 148, to show that tuberculin has not been relegated to the tomb of forgotton things, but has proved not only a valuable aid in the early recognition of the disease, both in animals and man, but also a curative agent when properly employed.

"Although the furore that followed the announcement by Koch in 1890 of a specific remedy for the treatment of tuberculosis soon subsided, in consequence of misguided zeal, unrealized anticipations, and disappointed hope, the distinguished bacteriologist, who, at the time, appeared to be forced by his Government into a premature publication, has persisted in his investigations along the same lines, and a number of the more conservative of those who adopted his suggestions still continue in the use of his products. It has been shown, at least, that tuberculin is capable of inducing local and general reaction in the presence of tuberculosis, and that by the systematic injection of gradually increasing doses it is possible to render the infected individual resistant to the toxic activity of the products of the tubercle bacillus. The former of these phenomena has been successfully applied in the early diagnosis of the disease, particularly in animals, and the latter in the treatment of the developed disease.

"In a thoughtful address, delivered recently before the tuberculosis commission of the Society of German Naturalists and Physicians, Petruschky (Berliner Klin; Wochenschrift 1899, Nos. 51 and 52), director of the Bacteriological Institute of the city of Dantzig, pointed out the impossibility of curing tuberculosis with a single brief course of treatment with even specific remedies. By reason of the nature of the anatomical lesions of the disease such cure must consist in the permanent suppression of the infectious agents and their toxins, and treatment, to be successful, must therefore be extended over long periods of time. Mere restoration to physical activity and earning capacity is not sufficient.

"Upon the basis of nine years experience, Petruschky expresses the opinion that the desired result can be obtained with the aid of tuberculin, and he reports 22 cases in which cure in this sense was effected, the patients being freed of symptoms and not reacting to injections of tuberculin, and tubercle bacilli being absent from the sputum for periods of from six to twelve months. A graduated plan of treatment was pursued, the injections being discontinued with the cessation of the reaction to tuberculin, and being resumed at intervals of three or four months, when it was found that the reaction to tuberculia was again present."

THE VALUE OF DIPHTHERIA ANTITOXIN.

A similar answer is at hand in regard to the value of diphtheric antitoxin, and as the author of the report, Senator Gallinger, himself

a physician of eminence, felt convinced at the time of writing the report that antitoxin was still on trial, and as he expressed the hope that this remedy for diphtheria may yet be found to be one of genuine merit, we beg leave to offer the following statistics, collected by Dr. John E. Walsh of the health office in this city, to February, 1898:

"Of 422 cases of diphtheria reported, 211 received antitoxin; 190 did not, and in 21 cases the method of treatment is unknown.

"Among the antitoxin cases only 8 died, a death rate of 3.8 per cent; while of those not so treated 65 succumbed—a mortality of 34.2 per cent, which was the average rate for the 10 years preceding the use of antitoxin."

These figures are of special value, as they represent the experience of the entire profession of this city, regardless of school or system of practice, and "if the old-fashioned sore throat and follicular tonsillitis were called diphtheria" in one class, they were also erroneously included in the other.

Class of—	Cases.	Deaths.	Per cent of mortality.
1890	397	137	34.
1891	475	164	54.5
1892	553	182	32.9
1893	377	128	33.9
1894	422	172	40.7
1895[1]	418	124	29.6
1896	326	76	23.3
1897	620	110	17.7
1898	700	131	18.7

[1]Antitoxin began to be used.

THE ADVANCEMENT OF MODERN SURGERY.

On page 3, Senate Report No. 1049, appears the following language: "It was claimed before your committee that surgery of the abdomen has been brought to its present high standard through vivisection, and yet it is a fact that Dr. Lawson Tait, the greatest ovariotomist in the world, is on record as saying that 'instead of vivisection having in any way advanced abdominal surgery, it has, on the contrary, retarded it.'"

Dr. Tait is now dead, and it ill becomes us to question the soundness of his views; but we do venture to assert that if Dr. Tait's early surgical training was acquired without experimentation upon the lower animals, he was guilty of the awful charge of experimenting upon human beings.

Gentlemen of the committee, if you were located in some isolated section of this broad land and it was your misfortune to require some important abdominal surgical operation, such as the removal of a diseased kidney, removal of an impacted stone in the ureter (which conducts the urine from the kidneys to the bladder), or the removal of impacted gallstones, or the excision of a gangrenous portion of intestine and stitching the sound ends of the bowels together, or any one of the more important abdominal operations, would you be willing to intrust the operation to a man who had never performed it even upon the lower animals? Would you be willing to be yourself or to have any member of your family a subject for vivisection, and yet, if Lawson Tait's views were accepted by you as conclusive and acted upon by the profession generally, all experiments in the future for the advancement

of medical knowledge would be conducted on human patients, since he was opposed to all experiments upon the lower animals.

Fortunately for humanity and the progress of surgery these views and Mr. Tait's opposition to antiseptic surgery are not shared by surgeons generally, and Dr. Robert T. Morris, in a letter to Senator McMillan, December 27, 1899, has supplied you with facts which show the fallacy of Mr. Tait's statement, and sufficiently demonstrate what may be accomplished by a few well-directed experiments on rabbits and dogs in the perfection of surgical methods in the way of saving life and preventing suffering on the part of human beings.

TRIUMPHS OF MODERN SURGERY.

The triumphs of modern surgery do not cease here, however. We have already stated that there are 45,000 deaths from typhoid fever annually in this country alone. In our recent war there were 202 deaths from bullets and 2,774 from typhoid fever. It is claimed that about one-eighth of all the deaths from typhoid fever are caused by perforation of the bowels, and the question presents itself, can any of the 5,625 cases be saved by surgical interference? Dr. Keen, the distinguished surgeon and president of the American Medical Association, has told us, "When every case of intestinal perforation (except the moribund) is operated upon within twenty-four hours, we shall save at least one-third of the cases, and possibly more." If this be true, and he can speak from personal experience, 1,875 and more lives can be saved annually in our own country, as the direct outcome of animal experimentation, and Dr. Busey's statement on the subject of curing typhoid fever, which was held up to ridicule by Dr. Leffingwell, is more than sustained.

Time will not permit us to review in detail Dr. Leffingwell's criticism of Dr. Busey's statement before the Commissioners (pp. 91–96, S. R. 1049), in speaking of the value of animal experimentation within the past two decades, * * * "which has opened a new and promising field to surgery, by which people who formerly died, or who were left worse, perhaps, than dead, living simply as animals, have been restored to such life that they are again useful, and is leading up to the point that we may be enabled to save the lives of that vast number of people who are suddenly stricken with apoplexy."

If Dr. Leffingwell will carefully collect and study the instances of the successful application of surgery to the brain, stomach, intestines, liver and gall bladder, kidneys, and other organs and parts of the body, when he recalls to mind that even wounds of the human heart have been successfully sutured in four of the nine cases reported, all of which, before the introduction of antiseptic procedures were practically inaccesible to surgical relief, and when he will inform himself of the extent to which animal experimentation has been employed to render so successful these operations, he will possibly feel less disposed to ridicule the statements and hopes expressed by the venerable president of the medical society.

In reference to Dr. Leffingwell's allusion to the inoculation experiments performed by Dr. Sternberg with human saliva, we have neither the time nor inclination to discuss his unfair presentation of the case (Senate Doc. 78, Fifty-fifth Congress, third session, pp. 4 and 5), except to say, that if Dr. Leffingwell had comprehended the full meaning of

these experiments he would have realized that they led up to the discovery of the pneumococcus as the cause of pneumonia, and demonstrated the presence in human saliva of a disease producing microorganism of great importance in the causation of various diseases.

We have photographs of a patient showing the result of bites by a man, which, with the history, were presented to the Medical Society of the District of Columbia May 11, 1898, and we believe that if Dr. Sternberg's demonstration had been generally known and appreciated the treatment at the very outset of this case would have been directed to the destruction of the germs in the wound and this poor woman's eyesight and three weeks suffering with her eyes literally "rotting out" might have been spared.

Senate Report 1049, page 5, attaches considerable importance to the number of distinguished men and women who indorsed the bill. We do not deprecate the feelings of these well-meaning people which prompted their indorsement, and yet how many of the signers are unconsciously committing some act of cruelty; how many persons ride behind horses which have been clipped in winter; how many ladies wear furs and feathers obtained from animals especially killed for this purpose; how many use ostrich feathers and sleep under down quilts picked from live birds; how many eat spring lamb taken prematurely from their mothers; how many inflict pain upon animals solely for sport! When we realize all this, and the fact that have we as yet no law for the compulsory support of children by their parents in this city, we feel that even this distinguished class of advocates for the bill might profit by Mantegazza's demonstration of the physology of pain, and Goltz's "experiments to test the strength of maternal solicitude and affection." We may, moreover, well ask to what extent the signers of this petition were correctly informed as to the effects of this bill and had familarized themselves with the needs of biological and medical science and practice.

The writer is not a vivisectionist, and the only experiments performed by him were made with a view of demonstrating the disease-producing properties of certain germs found in the Potomac water. He has worked for six months in the hygienic laboratory of the Marine-Hospital Service, and studied the methods in vogue in other Government laboratories, and knows from personal observations that the experiments there are conducted on humane principles. Were it otherwise, General Sternberg would not have courted a public inspection, which is evidence of good faith. His invitation should be accepted before any legislation of the character contemplated in this bill is enacted, for it is claimed that the law is needed to check abuses which in the opinion of those in a position to know do not in fact exist.

The same Senate report, on page 7, emphasizes the fact that the bill is restrictive, not prohibitive. In reply to this we earnestly reiterate the statement that there is already a restrictive law, and why enact new laws until it is shown that the current law has been tested and found deficient.

If the Washington Humane Society, in the face of General Sternberg's challenge for investigation and armed with extraordinary powers to search suspected premises, has failed to produce a single instance of cruelty, the profession has a right to assume that the evils sought to be remedied do not exist; but even if they did exist in any of the Government laboratories, an order issued by the Executive or any of *his Cabinet officers* would certainly prevent their repetition.

On the whole, it seems to us that to gratify the desire of the Washington Humane Society for the enactment of a law the necessity for which has not been proven would be an unwarranted reflection upon a humane profession, and simply be one step, and that an important one, in the direction of prohibiting vivisection altogether and dealing a death blow to the progress of American medicine. We have abundant evidence that this kind of legislation in England, although there the law is less restrictive than that proposed in this bill, has retarded scientific discovery, for the great advances in modern medicine since the passage of the British antivivisection law have come from other countries than Great Britain.

GEO. M. KOBER, M. D.,
Chairman of the Committee on Public Health.

The letter of Dr. Park, referred to by Dr. Keen, is as follows:

LETTER OF DR. ROSWELL PARK.

BUFFALO, *February 19, 1900.*

Dr. W. W. KEEN.
(Care of Dr. S. C. Busey, No. 901 Sixteenth street NW., Washington, D. C.)

MY DEAR DOCTOR: As it is quite evident that I shall be unable to get away at this time to meet you in Washington, I take the liberty of writing from Buffalo, and to the following effect: I should like very much to go on record as being, first of all, opposed to any unnecessary cruelty or hardship in the practice of vivisection or laboratory investigation, and yet, on the other hand, as being most insistent upon the value of such study to scientific medicine. Surely it must be because men are not familiar with the progress of medical science and the means by which it has been effected that they take positions so antagonistic to the latter. Surely, too, no one can better remind them than you yourself of the fact that every great achievement of modern surgery during the past twenty-five years, during which period nothing but electricity can compare with it in progress, has been the outcome of work carefully planned and carried out in detail in physiological and pathological laboratories upon lower animals.

I wonder if there be one of the antivivisectionist party who would be willing to have, for instance, such an operation as intestinal resection practiced upon one of his family by a surgeon who had never yet done it. This is a kind of experience which must be first learned upon animals, else in overdoing sentiment toward the lower animals we become inhumane to our own race. Surely, if it be legitimate to use animals for food it is equally legitimate to use them for other life-saving purposes, such as the learning to do operations or learning the nature of various diseases.

In the surgery of the last twenty-five years nothing stands out as a more brilliant attainment than the total extirpation of various organs, which is now so often and so successfully accomplished. Please remind these gentlemen that nothing of this kind was possible until its practicability had been worked out in the laboratory. Please remind them, also, that while you and I do not to-day need to do this work for our own education, it will be necessary for certain men every year to do it in order to acquire the same facility and technique, and that this is a kind of work which can not be done once for all, but must be done over and over again by successive classes of students.

They must know also that questions of such vital importance as the character of tubercular disease, of anthrax, diphtheria, and of many other infectious diseases, as well as their successful therapy, have been worked out in this same fashion, at the expense of some animal lives to be sure, but resulting in the salvation of thousands of human beings. Which are the more valuable?

Finally, with regard to the nature of cancer, a subject at which, as you know, we are working here very hard with State aid, and upon which we are gaining month by month additional light. If this kind of laboratory work were to be forbidden us it would simply paralyze the laboratory and render all our work futile or useless.

I realize very well that you will say all this and much more to the committee, and yet I feel so strongly in the matter that I could not avoid at least writing this to you and asking you to present it if you see fit.

Very sincerely, yours, ROSWELL PARK.

Senator GALLINGER. A good deal of latitude has been given to the opponents of the bill in the matter of filing papers, and if the advocates of the measure have papers which they wish to file it will be permitted. I do not imagine that there will be an abuse of the privilege.

STATEMENT OF DR. ALBERT LEFFINGWELL, OF AURORA, N. Y.

Senator GALLINGER. Let me ask you, Dr. Leffingwell, whether you are a medical practitioner.

Dr. LEFFINGWELL. I am a qualified physician, but have retired largely from active practice. Formerly, as a student of medicine, I was also an instructor in physiology.

Senator GALLINGER. Have you done anything in the way of experimental vivisection, as you understand it?

Dr. LEFFINGWELL. I have, and will refer to it presently.

Senator GALLINGER. You may proceed with your statement.

Dr. LEFFINGWELL. Mr. Chairman and gentlemen of the committee, it is now about twenty-eight years, since,—touched by the protest of a man whom I greatly revered and one who has addressed you to-day,—I came to question the rightfulness of unlimited vivisection. As I look backward it seems to me that there was no phase of experimentation then in vogue that I was not eager to practice, either as an aid to memory or for the instruction of pupils, and, filled with the confident enthusiasm of youth, I had believed that nothing in vivisection could be wrong that a man of science might approve. From that day to this I have thought much and both written and spoken somewhat on this question, but never a word against vivisection in and of itself; never without conceding its utility and rightfulness in certain directions. A believer in vivisection, I know that the practice has been abused, and it is solely against the abuses that have pertained to it, against practices that overstep the boundaries of humanity, that I have made my protest for the last twenty years.

I have been greatly interested, and by no means without giving a considerable degree of assent, in listening to the arguments of those who have opposed the legislation which we seek. It has almost seemed to me that the majority of the speakers could never have read the bill. As I listened to that eminent surgeon who opened the discussion, who told us of the advantage which vivisection had been to that art wherein he has attained such success, or to those other medical gentlemen who have dilated upon the gains to medical science through animal experimentation, I have said to myself, "Why, we agree with you; but what has that to do with the bill?" All the researches upon which these discoveries depend are permitted by this measure. This is not a bill for the abolition of vivisection, but for the prevention of its abuses.

I do not think, Mr. Chairman, that the bill has been opposed in quite the proper way. A short time ago, for instance, I took up a copy of a medical periodical, The Journal of the American Medical Association. Permit me to read from the leading editorial in the issue of December 23, 1899.

To the members of the medical profession in the United States:

The cause of humanity and of scientific progress is seriously menaced. Senator Gallinger has again introduced into Congress the bill for the "Further prevention of cruelty to animals in the District of Columbia," which he has so strenuously and misguidedly advocated in the last two

Congresses. It is Senate bill No. 34. Twice the Committee on the District of Columbia has, also unfortunately and misguidedly, reported the bill with a favorable consideration. It is speciously drawn to seem as if it were intended only in the interest of prevention of cruelty to animals, but the real object is twofold: 1, to prohibit vivisection and, 2, to aid the passage of similar bills in all the State legislatures.

It hardly needs to be pointed out that this would seriously interfere with or even absolutely stop the experimental work of the Bureau of Animal Industry and the three medical departments of the Government—the Army, the Navy, and the Marine-Hospital Service. The animals themselves might well cry out to be saved from their friends. No more humane work can be done than to discover the means of the prevention of diseases which have ravaged our flocks and herds. All those who raise or own animals—such as horses, cattle, sheep, pigs, chickens, etc.—are vitally interested in the preservation of their health and the prevention of disease.

The inestimable value of these scientific researches as to the prevention and care of disease among human beings it is superfluous to point out. Modern surgery and the antitoxin treatment of diphtheria alone would justify all the vivisection ever done.

As my attention has been called officially to the introduction of the bill, I take the opportunity of appealing to the entire profession of the country to exert itself to the utmost to defeat this most cruel and inhuman effort to promote human and animal misery and death and to restrict scientific research. It is of the utmost importance that *every physician* who shall read this appeal shall *immediately* communicate especially with the Senators from his State; shall also invoke the aid of the Representatives from his or other districts in his State, and by vigorous personal efforts shall aid in defeating the bill.

It is especially requested, also, that all of the national, State, and county societies, at their next meeting, take action looking toward the same end. If regular meetings are not soon to be held, special meetings should be called. Correspondence is invited from all those who can give any aid.

The Committee on the District of Columbia consists of Senator James McMillan, chairman; and Senators J. H. Gallinger, H. C. Hansbrough, R. Redfield Proctor, J. C. Pritchard, Lucien Baker, C. P. Wetmore, C. J. Faulkner, Thomas S. Martin, William M. Stewart, and Richard Kenney. Personal letters may be addressed to them or to other Senators. Petitions should be addressed to the Senate of the United States.

W. W. KEEN, M. D.,
President American Medical Association.

It seems to me, Mr. Chairman, that the author of that editorial took upon himself a very grave responsibility. He was addressing the whole medical profession in this country, a body of over a hundred thousand men; and he was inflaming their minds against this bill—one which the vast majority of them would never have occasion to read—as a measure, the object of which was the "prohibition of vivisection." He appeals to them to write letters to Senators, to hold meetings of medical societies to pass resolutions of protest against this measure. I believe one speaker (Dr. Hare) has referred to these letters and these resolutions, and that he put the question to the committee whether "you have not received protests from all parts of the country against this bill?" Why of course you have received protests. This editorial explains why. In the medical society to which I belong, in one of the largest cities in the

country, the matter was brought up, and a resolution passed and ordered sent to you—in condemnation of this bill—the object of which the members were told, was "to prohibit vivisection in the District of Columbia."

Let us examine the assertion that this bill "prohibits vivisection." Take experiments in bacteriology. They constitute, Dr. Woodward says, "nearly all the vivisection done in this District." Now, where are they prohibited? Inoculation experiments are specifically mentioned as allowed without the administration of anæsthetics. Take experiments pertaining to surgical operations, such as those instanced by Dr. Morris, of New York, in a recent letter to this committee. Suppose this bill became a law, and that some surgeon desired to make experiments of that kind. What would be his course of action?

Well, in the first place, he would be obliged to obtain a license permitting him to perform vivisection. A reputable man would have no difficulty about this. I know that it has been said that nothing—that no law should stand in the way of anyone desiring to make experiments; some who have to-day addressed you have declared in writing that legislation defining who may or may not perform experiments would be "offensive in the highest degree." Well, we differ with that view. There is a class of men, who, in the interest of society, in the interest of humanity, in their own interest, should never be permitted to perform vivisections. In one of his works, Dr. George M. Gould says:

"If a very limited use of vivisection experiment is necessary for scientific and medical progress, it must be regulated by law, carried out with jealous guarding against excess and against suffering, and the maimed animals painlessly killed when the experiment is complete. The practice carried on by conceited jackanapes to prove over and over again already ascertained results, to minister to egotism, for didactic purposes—these are not necessary, and must be forbidden."

What does this mean? Who are the "conceited jackanapes" in the medical profession? They are performing experiments which he tells us "are not necessary and must be forbidden."

Senator GALLINGER. Who is Dr. Gould?

Dr. LEFFINGWELL. He is the present editor of The Philadelphia Medical Journal, and one of the leading medical writers of the country.

Senator GALLINGER. He is the author of some books, is he not?

Dr. LEFFINGWELL. Yes; he is the author of a medical dictionary, a philosophical work, "The Meaning and Method of Life," and one or two volumes of medical essays. He is a very strong provivisectionist, and I cite him only to show that abuses exist, and that there are those to whom the liberty of vivisection should be forbidden. There are those who, not only for vanity experiment upon living creatures, but also for the gratification of the lowest instincts, for the satisfaction of the basest lusts. We say that the restriction of the privilege of vivisection to proper persons will not injure the interests of science. We assert that the man whose heart burns with the ferocity of Nero or the lust of Tiberius ought by the law to be forbidden to enter the laboratory for vivisection. But these are exceptional cases. Certainly, such restriction of the practice to proper persons does not mean prohibition.

In the next place, the bill provides for the registration of the places where vivisection is to be carried on, and for the inspection of the laboratories by duly appointed Government officials. Where is there any prohibition of vivisection in that requirement? At the hearing on this bill in April, 1896, the Surgeon-General stated:

I would say that the laboratories of the Surgeon-General's department are open to inspection. If any reputable person in this city desires to visit our laboratory to see *what is* done there, he would not be refused. There is nothing to be concealed.

Now, I take it, this is fairly meant. I shall not assume that any reputable person, accepting this invitation, must send previous notice, so that all to which criticism might be offered can be hidden away before he comes. Not at all. The Surgeon-General means, we infer, precisely what he says. Very well; where, then, is the hardship of official inspection? Does anyone have the audacity to say that official inspection, such as this bill provides, will "prohibit vivisection," and yet declare that all the laboratories are open to any reputable person in this city? The absurdity of this must be manifest to you all. Add to the above restrictions the clauses providing for reports, for the use of anæsthetics, and for the utility of the experiments to be permitted, and you have the bill. I respectfully submit, Mr. Chairman, that the charge that this bill would "prohibit vivisection" is absolutely untrue.

Mr. Chairman, I have never said that this was a perfect bill. We are open to suggestions for its improvement from any quarter. Speaking to day to one of the gentlemen who has appeared before you in opposition, I told him that I had no doubt of our ability to come to an agreement with the other side, provided they would concede the principle of Government supervision. "What are you afraid of?" I asked him. "Why, it is that clause about inspection," he replied; "we are afraid that it will be so used as to prevent scientific experiments of any kind." Well, has it had that effect in England? Not long ago I received a letter from a gentleman whose eminence as a surgeon will be recognized by all of the medical gentlemen present; I refer to Sir John Eric Erichsen, F. R. S. It is a statement of his views on the subject of vivisection, and his sentiments are my own. He says:

> Experiments on living animals are absolutely necessary for the advancement of medical surgery and biological science. Such experiments should not be allowed without proper restrictions as a safeguard against their abuse by incompetent persons, or their being performed for futile purposes. Such experiments should only be performed for purposes of utility—that is, the advancement of scientific knowledge—and not for the purpose of acquiring manual dexterity; nor should they be allowed as class demonstrations or for needless repetition. All experiments on living animals, if painful, should be performed under an anæsthetic.
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> Experiments on living animals are most carefully restricted in this country. * * * I acted as Government inspector of living animals for several years, and I can safely assert that the provisions of the act were vigorously enforced, and never, to my knowledge, contravened.

"Vigorously enforced!" Against whom? Why, against those who would break the law. There is no complaint or criticism of a restrictive law here. I have heard it said: "Why, no physician could be induced to act as an inspector of laboratories if this bill becomes a law." Well, here is a medical man, a surgeon of undoubted distinction, who acted as Government inspector for several years, and he had not a word to say against the law which it was his duty to enforce.

Another objection raised is that legislation is unnecessary. "Only properly conducted scientific experiments under proper authority are now allowed," says the Secretary of Agriculture. Certainly, that is the law. It was Cardinal Newman, I think, who declared that in any discussion it was first necessary "to define your terms;" and that, certainly, is necessary here. What are "properly conducted experiments," and who are the "proper authorities?" The proper authority is the man in charge of the vivisection laboratory or at the head of the department under which vivisection is conducted. What is a "properly conducted experiment?" Why, any experiment which any scientific investigator may wish to perform, is it not? Does some student of physiology desire to repeat those atrocious experiments of Mantegazza, who tested the extent to which animals might endure torture, who invented

a machine which he appropriately called his "tormentor," with which, he says, "I can take an ear, a paw, or a piece of skin of the animal, and by turning the handle squeeze it beneath the teeth of the pincers; I can lift the animal by the suffering part; I can tear it or crush it in all sorts of ways." Is this other than a "properly conducted scientific experiment?"

It is said that Mantegazza has long contemplated a visit to this country. Is there a man here who will say regarding this distinguished physiologist, "I would not permit him to make his experiments in my laboratory, because he can not do them properly?"

Dr. SALMON. What are the courts for?

Dr. LEFFINGWELL. Who is to bring them before the courts? Is Mantegazza to report them himself? Are they to be reported by the head of the laboratory who gives him permission for their performance? Do you expect that any medical student witnessing them would dare to denounce them to the courts? Any conceivable experiment may be performed, notwithstanding the present law—provided only that permission be given by the man at the head of the laboratory. Why, simply to illustrate what may be done, let me refer to the experiments of one Dr. H. G. Beyer, a Government employee at the United States National Museum, made upon a large number of dogs. Morphia was administered; then the animal was fastened in a "dog holder," its trachea, or wind-pipe, dissected out, curare injected, and artificial respiration begun.

I shall not go into all the details of his experiments—the dividing of nerves, the dissecting out of arteries, the insertion of cannulas, until finally "the whole front and sides of the thorax are cut away and the right subclavian artery dissected out and tied." I mention all this only to show that animals, twenty-five or thirty in number, may be slowly dissected alive without anæsthetics; that their death, under curare, may be accompanied, as Claude Bernard puts it, "by suffering, the most atrocious the imagination of man can conceive;" that all this may be done by one of the paid servants of the United States, and yet not the slightest protest be raised. I submit, therefore, that the existing law is not sufficient to prevent unjustifiable experimentation.

A third objection against the bill is that legislation is unnecessary, because in the District of Columbia no really painful experiments are performed. For instance, in 1896 a memorial against this bill was presented by the medical and scientific societies of Washington. Therein was quoted a passage from a letter of Surgeon-General Sternberg, which, these scientific societies affirmed, "applied as well to other Government laboratories in Washington in which biological research work is conducted." This quotation is a most remarkable one. Anyone reading it carelessly would understand from it that no painful experiments were performed in this District of Columbia, and that, therefore, there was not the slightest occasion for any concern. The quotation is as follows:

"The experiments which have been conducted at the Army Medical Museum since I have been Surgeon-General of the Army, and, so far as I am informed, previous to that time, relate principally to the cause and prevention of infectious diseases, and to the results of diseased processes (pathology)."

And then follow these remarkable words, to which I invite your special attention:

"*These experiments do not call for any painful dissections, but consist in the subcutaneous inoculation of cultures of various pathogenic bacteria, etc.*"

That paragraph is italicized in the memorial; it appears with emphasis. What was the object of that emphasis? Apparently it was to carry the implication that painful experimentation did not exist in the District of Columbia. Is there any other object for these italics? Yet that suggestion is simply an equivocation. Instead of answering this argument myself, let me simply quote from the address delivered last August at the British Medical Association by George Wilson, M. D., LL.D., the president of the section on State medicine. Speaking on preventive medicine, Dr. Wilson, who is one of the leading authorities on that subject in Great Britain, states as follows:

I boldly say there should be some pause in these ruthless lines of experimentation. * * * I have not allied myself to the antivivisectionists, but I accuse my profession of misleading the public as to the cruelties and horrors which are perpetrated on animal life. When it is stated that the actual pain involved in these experiments is commonly of the most trifling description there is a suppression of the truth of the most palpable kind, which could only be accounted for at the time by ignorance of the actual facts. I admit that in the mere operation of injecting a virus, whether cultivated or not, there may be little or no pain, but the cruelty does not lie in the operation itself, which is permitted to be performed without anesthetics, but in the after effects. Whether so-called toxins are injected under the skin into the peritoneum, into the cranium, under the dura mater, into the pleural cavity, into the veins, eyes, or other organs—and all these methods are ruthlessly practiced—there is long-drawn-out agony. The animal so innocently operated on may have to live days, weeks, or months, with no anesthetic to assuage its sufferings and nothing but death to relieve.

It is rather a remarkable incident, it seems to me, when the president of a section in the British Medical Association accuses his professional brethren of "suppression of the truth." I fancy that his statement will not be denied; that on closer questioning we should find that a little painful experimentation is going on even in this District of Columbia. And I call attention to one singular fact. All these experiments in pathology, which certainly would be objected to by antivivisectionists, are permitted by this very bill, which its opponents have denounced from Maine to Texas as "prohibiting vivisection."

Mr. Chairman, it seems to me a significant circumstance that in all the criticism which has been made by the opponents of this measure not a single suggestion has come from any quarter looking to its improvement in any particular. That signifies a great deal. It means that all this verbal criticism of details is meaningless; that no improvement would make it acceptable to those men who demand absolute and unrestricted freedom to do exactly as they like in the vivisection of animals.

This is the line of division between our position and that of those who are active in opposition to this bill. We say that Congress should absolutely forbid the performance of wanton, useless, and cruel experimentation. "No," say the advocates of free and unrestricted vivisection, "let there be no restrictions except such as we ourselves may see fit to impose upon our own action." "Unnecessary and offensive in the highest degree would it be by any system of official inspection, * * * or by legislation of any kind, * * * to attempt to dictate or control how, and by whom, and for what purposes, and under what conditions * * * experiments shall be made." That is the position of those who oppose this bill. Four of the gentlemen who have spoken here to-day have affixed their signatures to that sentiment, and it is one, I do not hesitate to say, that throws wide open the door to every form of scientific cruelty.*

* Senate Doc., Report 1049, p. 135.

Should experiments like those of Mantegazza be forbidden here in Washington? "By no means," is practically the response of our opponents. "As to whether, under given circumstances of research or teaching, an experiment involving pain should be performed is a matter which should rest with the responsible expert by whom or under whose direction the thing would be done." This also opens the door to Mantegazza and permits everything that this "responsible expert" may see fit to do, and this statement is signed by Dr. Sternberg, Dr. Salmon, and Dr. Welch, with many others who are eminent in the art of vivisection.

Now, this view of the irresponsibility of science to the ordinary obligations of humanity—this theory of scientific anarchy—we must oppose. We oppose it in behalf of that ideal of humaneness which lies at the foundation of all those great reforms which distinguish the nineteenth century above those which preceded it; which abolished the slave trade; which emancipated the negro and forbade the traffic in human souls; which took women and children out of the coal mines and forbade their employment at dangerous trades; which has made cruelty a crime. We must oppose it in behalf of those weak and ill-regulated beings whose first impulses to crime may be due to habitual indulgence in unlimited vivisection.

You say, perhaps, that such cases never occur. Not long ago I stood by a nameless and almost forgotten grave. It was the last resting place of a man of science; a man who had been revered and honored in his profession, and against whose reputation the breath of calumny had never come. And yet that man had lured to his laboratory a brother physician, had stabbed him to the heart, and had suffered the penalty of murder. As I stood by that dishonored grave I said to the old man who had pointed it out to me, "Did you know him?" "Yes," said he, "I knew him." "Well, do you not think that, after all, his story might have been true—that the deed was done in sudden anger, and that he had not lured his old friend to his laboratory for the purpose of committing a murder?" "No," said the old man, "I think that he did it." "But why?" I asked. "Any man," said he, "that would take a living dog and nail him to a board, and cut him up alive, would be capable of committing murder—and that is what he did." (Applause.) That is the sentiment of the common people. It is more than a sentiment; it is a truth.

And finally in the name of science herself we oppose this theory that vivisection should be without restraints. Before me here are men distinguished as scientific workers in various States, and yet a century or two hence, with some possible exception, everyone here will be forgotten by posterity as completely as if he had never lived. But in my hand I hold a statement of belief concerning vivisection to which is affixed a name that will be linked to the history of science as long as science herself shall endure. Let me read it:

VIVISECTION RESTRICTED BY UTILITY.

Vivisection is a practice of such variety and complexity that, like warfare between nations, one can neither condemn it nor approve it unless some careful distinctions be first laid down. We hold that only a great and definite advantage to the interests of humanity can justify its use, and that in each case science must prove that advantage and that necessity; its hands should not be left free to inflict torture without restriction or restraint. Even the zeal of a Magendie or a Mantegazza can not condone their cruelty, nor can science make the search for a fact obliterate the distinctions between right and wrong. Within certain limitations we regard vivisection to be so justified by utility as to be legitimate, expedient, and right. *Beyond these boundaries* it is cruel, monstrous, and wrong.

Experimentation upon living animals we consider justifiable when employed to determine the action of new remedies; for tests of suspected poisons; for the study of new methods of surgical procedure, or in the search for the causation of disease—in short, for any object where the probable benefit to mankind is very great and the suffering inflicted not greater than that of instantaneous death nor more than the pain and distress of the human ailments, to alleviate which the experiment is made. On the other hand, we regard as cruel and wrong the infliction of torment upon animals in the search for physiological facts which have no conceivable relation to the treatment of human diseases, or experiments that seem to be made only for the purpose of gratifying a heartless curiosity—such, for example, as those described in the work of Professor Mantegazza, entitled "The effect of pain upon respiration."

We consider as *wholly unjustifiable* the practice of subjecting animals to torture in the laboratory or classroom, merely for the purpose of demonstrating well-known and accepted facts. We hold that the infliction of torment upon a living animal under such circumstances is not justified by necessity, nor is it a fitting exhibition for the contemplation of youth. And since in England, Scotland, and Ireland such experiments as these are regarded as degrading in tendency, and are therefore forbidden by law, we think no harm will come to science if they shall also be forbidden in every American State.

We believe, therefore, that the common interests of humanity and science demand that vivisection, like the study of human anatomy in the dissecting room, should be brought under the direct supervision and control of the State. The practice, whether in public or in private, should be restricted by law to certain definite objects, and surrounded by every possible safeguard against license or abuse.

That, sir, is my platform regarding vivisection. We have been told to-day by one of the advocates of free and unrestricted vivisection that he holds us and our principles in scorn. Well, we shall endeavor to bear up under the obloquy of his disdain, for our principles are those I have just read, and at the foot of this sheet of paper is the signature of the author of the theory of evolution—the greatest living exponent of modern science—Herbert Spencer, of England. (Applause.)

In the name of that ideal of science which Herbert Spencer represents, in the name of those whom the State should protect, in the name of humanity, we ask—not for the abolition of vivisection, not for restriction against useful and humane research, not for any impediment to the progress of medicine, but simply for some legislation that shall make vivisection subject to the law, prevent its abuses, and stamp its cruelty as a crime.

I beg to submit, also, as a part of my statement, the following documents pertaining to the subject of vivisection:

1. Extracts from an address before the Massachusetts Medical Society by Prof. Henry J. Bigelow, M. D., late professor of surgery at Harvard Medical School.

2. Extracts from the address before the British Medical Association, August, 1899, by George Wilson, M. D., LL. D., president of the section on State medicine.

3. Extracts from presidential address before the American Academy of Medicine, May 4, 1891, by Prof. Theophilus Parvin, M. D., LL. D., of Jefferson Medical College, Philadelphia.

4. Extracts from address on vivisection before the American Academy of Medicine by George M. Gould, M. D., 1896.

5. Extracts from document on scientific chicanery issued by the American Humane Association, 1899.

6. Letter from George Hoggan, M. D., of London, concerning vivisection in the laboratory of Claude Bernard, Paris.

7. Extract from the testimony before the royal commission, as given by Prof. Emanuel Klein, M. D., F. R. S., the present lecturer on physiology at St. Bartholomew's Hospital, London.

8. Document issued by the American Humane Association on "Vivisection in schools."

9. Extracts from report of the American Humane Association on "Vivisection in America," with expression of different views regarding the practice.

EXTRACTS FROM ADDRESS ON "MEDICAL EDUCATION IN AMERICA."

[Read before the Massachusetts Medical Society, by Prof. Henry J. Bigelow, M. D., late professor of surgery in Harvard University.]

How few facts of immediate considerable value to our race have of late years been extorted from the dreadful sufferings of dumb animals, *the cold-blooded cruelties now more and more practiced under the authority of science.*[1]

The horrors of vivisection have supplanted the solemnity, the thrilling fascination of the old unetherized operation upon the human sufferer. Their recorded phenomena, stored away by the physiological inquisitor on dusty shelves, are mostly of as little present value to man as the knowledge of a new comet or of a tungstate of zirconium; perhaps to be confuted next year; perhaps to remain as fixed truth of immediate value—*contemptible, compared with the price paid for it in agony and torture.*

For every inch cut by one of these experimenters in the quivering tissues of the helpless dog or rabbit or guinea pig, let him insert a lancet one-eighth of an inch into his own skin, and for every inch more he cuts let him advance the lancet another eighth of an inch, and whenever he seizes, with ragged forceps, a nerve or spinal marrow, the seat of all that is concentrated and exquisite in agony, *or literally tears out nerves by the roots*,[2] let him cut only one-eighth of an inch farther, and he may have some faint suggestion of the atrocity he is perpetrating when the guinea pig shrieks, the poor dog yells, the noble horse groans and strains—the heartless vivisector perhaps resenting the struggle which annoys him.

My heart sickens as I recall the spectacle at Alfort, in former times, of a wretched horse, one of many hundreds, broken with age and disease, resulting from lifelong and honest devotion to man's service, bound upon the floor, the skin scored with a knife like a gridiron, his eyes and ears cut out, his teeth pulled, his arteries laid bare, his nerves exposed and pinched and severed, his hoofs pared to the quick, and every conceivable and fiendish torture inflicted upon him, while he groaned and gasped, his life carefully preserved under this continued and hellish torment from early morning until afternoon for the purpose, as was avowed, of familiarizing the pupil with the motions of the animal. This was surgical vivisection on a little larger scale, *and transcends but little the scenes in a physiological laboratory.* I have heard it said that "somebody must do this." I say, it is needless. Nobody should do it. Watch the students at a vivisection. It is the blood and suffering, not the science, that rivets their breathless attention. If hospital service makes young students less tender of suffering, vivisection deadens their humanity and begets indifference to it.

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[1] Italics not in original.

[2] For illustrations of this phase of vivisection, see experiments of Professor Porter, of the Harvard Medical School, referred to in Journal of Physiology for April 6, 1895: "Exp. LXVI. Nov. 20, 1894. Rabbit, "*lightly narcotized* with ether." Left phrenic nerve "was seized near the first rib and torn out of the chest." * * * "I have made such experiments on thirteen rabbits and one dog, and the result has *always been the same.*" A beautiful engraving gives the respiratory curve of this rabbit, "the left phrenic nerve of which had been torn out."

In experiments upon the nervous system of the living animal, whose sensibility must be kept alive, not benumbed by the blessed influence of anæsthesia, a prodigal waste of suffering results from the difficulty of assigning to each experiment its precise and proximate effect. The rumpled feathers of a pigeon deprived of his cerebellum may indicate not so much a specific action of the cerebellum on the skin as the more probable fact that the poor bird feels sick. The rotary phenomena, once considered so curious a result of the removal of a cerebral lobe, were afterwards suspected to proceed from the struggles of the victim with his remaining undamaged and unpalsied side. Who can say whether a guinea pig, the pinching of whose carefully sensitized neck throws him into convulsions, attains this blessed momentary respite of insensibility by an unexplained special machinery of the nervous currents, or a sensibility too exquisitely acute for animal endurance? Better that I or my friend should die than protract existence through accumulated years of torture upon animals *whose exquisite suffering we can not fail to infer*, even though they may have neither voice nor feature to express it.

If a skillfully constructed hypothesis could be elaborated up to the point of experimental test by the most accomplished and successful philosopher, and if then a single experiment, though cruel, would forever settle it, we might reluctantly admit that it was justified. But the instincts of our common humanity indignantly remonstrate against the testing of clumsy or unimportant hypotheses by prodigal experimentation, or *making the torture of animals an exhibition to enlarge a medical school, or for the entertainment of students*, not one in fifty of whom can turn it to any profitable account. The limit of such physiological experiment, in its utmost latitude, should be to establish truth in the hands of a skillful experimenter, with the greatest economy of suffering, and not to demonstrate it to ignorant classes and encourage them to repeat it.

The reaction which follows every excess *will in time bear indignantly upon this.* Until then it is dreadful to think how many poor animals will be subjected to excruciating agony as one medical college after another becomes penetrated with the idea that vivisection is a part of modern teaching, and that, to hold way with other institutions, they, too, must have their vivisector, their mutilated dogs, their guinea pigs, their rabbits, their chamber of torture and of horrors, to advertise as a laboratory.[1]

BACTERIOLOGICAL RESEARCH AND PREVENTIVE MEDICINE.

[The presidential address in the section of State medicine. Annual meeting of the British Medical Association, Portsmouth, August, 1899, by George Wilson, M. A., M. D., LL.D.

In the brief interval at my disposal there is no subject on which I desire to speak out with more direct frankness and sincerity than the relations of bacteriological research and methods of treatment to preventive medicine. And at the outset I may be permitted to say that ever since the great Pasteur announced the results of his prophylactic inoculations, with respect more especially to fowl cholera and anthrax, I have been a close, and, I hope, unbiased, student of bacteriological lit-

[1] The last two paragraphs would seem to have some special reference. It is significant, perhaps, that this address was delivered the same year that HARVARD MEDICAL SCHOOL "became penetrated with the idea that vivisection is a part of modern teaching," and introduced from Europe the laboratory methods of Germany, now in vogue.

erature. I may say, too, that my attitude toward these newer methods of treatment was at first one of expectancy, though I could never see that there was any legitimate analogy between them and Jenner's great discovery, on which they are admittedly based; and the more I have studied them, the more firmly I feel convinced that they are based on errors, and are the outcome of illogical inductions, every one of them. That, you will say, is a very strong statement to make, but after all these long years of flickering hope *I am prepared to contend that the indiscriminate maiming and slaughter of animal life with which these bacteriological methods of research and experimentation have been inseparably associated can not be proved to have saved one single human life or lessened in any appreciable degree the load of human suffering.*[1] I have ventured to make that pronouncement before, but in halting, academic fashion; I reiterate it here and now with the strongest and fullest conviction. In order to make my contention as clear as possible, let me refer for a moment to the doctrine of immunity as illustrated by smallpox and vaccination.

We know there are certain infectious diseases one attack of which protects, as a rule, against any future attack, and that of all diseases this can be more emphatically said of smallpox than of any other. That was why inoculation was practiced for a time, and was successful, so far as the individual was concerned. The person inoculated suffered from the disease because he was inoculated with the actual *materies morbi*, but he ran the risk of suffering from perhaps a very severe attack, and became a center of infection unless he was isolated. Now, Jenner's happy induction was this: He knew that it was common talk that milkers who suffered from sores on their hands which they contracted from the vesicles on the teats of cows infected with cowpox were protected against smallpox. He therefore concluded that if he inoculated with the matter contained in the vesicles of cowpox instead of with smallpox matter he might be able to confer immunity against smallpox. He tried the experiment and tested it over and over again; and not only so, but by using the matter from the vesicle produced by vaccination he made the further discovery that he could confer immunity from smallpox by vaccinating from person to person—that is, by arm-to-arm vaccination in continuous series with this matter which had been originally obtained from the vesicles of vaccinia or cowpox. He thus made it clear that cowpox or vaccinia was a modified form of smallpox, and, as we all know, the experiment, though not an easy one, has been tried successfully and repeatedly to produce cowpox in the cow or calf by inoculating the animal with the virus of smallpox. Vaccination, therefore, induces vaccinia, and vaccinia protects against smallpox, because it is a modified form of the disease. Unlike smallpox itself, it does not confer absolute immunity, as Jenner imagined it would. It only confers a modified degree of protection against smallpox, because vaccinia is only a modified form of the disease itself by transmission of the virus through the cow or calf. And yet the protection afforded by successful primary vaccination is of such value that the successfully vaccinated in infancy are, as a rule, completely protected up to the age of 10 or 12, and are always made more or less immune through their whole lifetime, so that if they do become infected the disease manifests itself in a mild or modified form. But in order to confer complete protection primary vaccination must be supplemented by revaccination.

[1] Italics not in the original

Now, gentlemen, however much you may dissent from my first statement, I feel sure I can claim, I may almost say, universal agreement with this very rudimentary statement concerning smallpox and vaccination. But it has been admitted by Pasteur, Koch, and all of their followers that their methods of prophylaxis and cure are based on Jenner's happy inductive inspiration. Let me now further clear the way by a few other comparisons. In the first place, bacteriologists have failed to discover any pathogenic microbe either of smallpox or vaccinia which they can isolate with certainty, and I venture to predict that they never will discover any which they can label and cultivate as the *causa causans* of either disease. The few pathogenic microbes which bacteriologists have discovered associated with human disease, and which they can isolate and cultivate, are those of tuberculosis, diphtheria, enteric fever, cholera, and plague; but all these are found associated with necrosed tissues, and it is open to argument whether, instead of being labeled the unconditioned *causæ* of these respective diseases, they may not be performing a benign function in changing the necrosed tissues into harmless products, just as various kinds of micro-organisms are necessary to change filth and all dead organic matter into harmless matter. No specific organism has been discovered in respect to scarlatina, whooping cough, measles, or typhus fever; and, even granting the spirilla of continued fever and the micro-organisms of influenza, they can not be isolated and cultivated. Then, again, vaccine lymph must be taken from the vesicle at a certain stage of development. It is cultivated, and can only be cultivated, in the living body. When successfully used, as in vaccination, it is followed by manifestations of a definite disease known as vaccinia, with a well-defined incubation period and well-defined and characteristic symptoms—a varying amount of pyrexia, tumefaction at the point of vaccination—the vesicular stage and the pustular stage.

Let me now go a step farther, and institute comparisons with the so-called results of serum-therapeutics. We know that a successfully vaccinated cow or calf is made immune. We can, therefore, use the serum of a perfectly immune animal; but on reading all the experiments in this direction, as summarized by Dr. Copeman in his admirable work on vaccination, the serum of an immunized animal confers at the utmost only a doubtful and short-lived immunity, so doubtful as to be discarded altogether, and as a cure for smallpox it is of still more questionable efficacy.

On all these grounds, gentlemen, I boldly reiterate my statement that there is no legitimate analogy between Jenner's great discovery and these newer methods of prophylaxis or cure which are based on that discovery. And in passing I wish to say that there has never been a more deplorable travesty of a great name than to designate the Institute of Preventive Medicine the Jenner Institute. Jenner's experimental altar was no sacrificial altar; but anyone who has studied the recent widespread antagonism against vaccination can see that one of the most potent of them has been the rush of the younger men in the profession to use these antitoxin serums. The medical profession, though I may say they believe to a man in vaccination and revaccination as a full and complete protection against smallpox, are largely to blame for this revolt; and I boldly say that there should be some pause in these ruthless lines of experimentation to take a calm and candid review of the whole position of bacteriological methods in the prevention or cure of human disease.

I have not allied myself to the antivivisectionists, but I accuse my

profession of misleading the public as to the cruelties and horrors which are perpetrated on animal life. When it is stated that the actual pain involved in these experiments is commonly of the most trifling description, there is a *suppressio veri* of the most palpable kind, which could only be accounted for at the time by ignorance of the actual facts. I admit that in the mere operation of injecting a virus, whether cultivated or not, there may be little or no pain, but the cruelty does not lie in the operation itself, which is permitted to be performed without anæsthetics, but in the after effects. Whether so-called toxins are injected under the skin, into the peritoneum, into the cranium under the dura mater, into the pleural cavity, into the veins, eyes, or other organs—and all these methods are ruthlessly practiced—there is the long-drawn-out agony. The animal so innocently operated on may have to live days, weeks, or months, with no anæsthetic to assuage its sufferings, and nothing but death to relieve.

And what triumphs has bacteriology achieved in stemming the tide of human disease on these empirical lines? Pasteur's antirabic vaccination is, I believe—and others with me—a delusion. Koch's tuberculin cure for phthisis has long since been labeled as worse than worthless. As a test even for bovine tuberculosis, tuberculin possesses only a secondary and not a specific value. The much-vaunted antitoxin cure for diphtheria does not command the universal approval of even the physicians of the metropolitan fever hospitals. Just because tetanic antitoxin serum has failed when used subcutaneously, medical men have felt justified in deliberately trephining patients and injecting it into the brain substance, and one medical man has had the courage to confess, after making a post-mortem examination of his patient, that such treatment can no longer be justified. The serums used for the treatment of other diseases—such as the pneumococcic serum, the serum used for puerperal fever (the serum which was so much vaunted as another great discovery), Sanarelli's serum for the cure of yellow fever—are all of them allowed to slip into the lap of forgetfulness. I know these statements of mine will not command assent, but I have no ax of my own to grind except the clean-cut edge of truth, which I admit even bacteriologists are striving empirically to sharpen. I accuse none of want of good faith, but I think I can see—and will strive to make others see—that in the protection afforded by vaccination against smallpox, nature gives no authority or warranty for these reckless experiments. The bacteriologists so dominate the public press that we almost seem to live in a bacillus-stricken world.

And, so far as preventive medicine is concerned, bacteriology has rather led us on false lines in assuming that the pathogenic microbe of any disease is the *causa causans* of that disease. I venture to say that the unconditioned microbe need have no terrors for humanity. We know that there are certain diseases which are notoriously infectious, therefore we isolate. We know that there are others which breed on filth, therefore we say be clean, and insist on cleanliness of house and home, of the water we drink, the food we eat, of the air we breathe.

Bacteriology has assisted, and largely assisted, preventive efforts of disinfection, isolation, and so on, but it can never confer immunity against disease except by using minimal doses of the virus of that disease, and that virus, I say, to be effectual can only be cultivated and bred in the living body, not cultivated artificially in organic media. I do not hesitate to designate the whole list of therapeutic serums as the materia medica of septic therapeutics. We talk of aseptic surgery, and we begin to know something of its absurd ritual when it is gravely

advanced that even masks are to be worn on the face because the beard of the surgeon may harbor pathogenic germs. Hahnemann was denounced for his absurd doctrine of *similia similibus curantur*. We are all accepting it now on these utterly empirical lines, and institute a crusade against tuberculosis as if the tuberculosis bacillus was the sole *causa causans* of the disease.

I say that we can only fight phthisis on the old lines, by improving heritage when that is possible; by improving the homes and conditions of life and labor, which are always possible, and always call loudly for interference. But this insane hunt after the tubercle bacillus, as if it could be bottled up in twopenny-half-penny spittoons and got rid of, is the insanest crusade ever instituted on illogical lines. Bacteriologists are not sure of their tuberculosis bacillus, and it is a moot question whether the bacillus which is found in milk, and which is labeled as the tubercle bacillus, is not a cow-dung bacillus. A distinguished bacteriologist has admitted it. I venture to reiterate it.

Institute sanatoria all over the country by all means. People will flock to them who can pay; but so far as public bodies are concerned (the guardians of the insane and the poor), I say this, and deliberately: Your asylums are full of these phthisical patients; your huge workhouses are full of them. Begin by experimenting on them, and do not declaim all over the country that this crusade, because it has been patronized, and rightly patronized, by royalty, is to seize hold of the national mind. It looks to me as if we were returning to the days when the king's touch was regarded as the cure for the king's evil, and when all sorts of decoctions were the prized cures for human infirmities.

The physician can never cure; he can only direct and assist nature in eliminating the *materies morbi*, whatever it may be.

In my student days I was taught that there was such an influence, such a *vis* as the *vis medicatrix naturæ*. That appears to be no longer recognized as of any efficacy, and now when a patient does not die or survive bacteriological treatment he is claimed as an instance of cure. For years back the papers have been flooded with these isolated mythical cures, and I am told that the consensus of the medical profession is against me; but I console myself with the reflection that medical opinion in these days means only the opinion of bacteriologists, who are, I admit, our smartest men, win our research scholarships, and imbibe their creeds on the Continent, and so they return and become our teachers; *but the whole of bacteriological theory and practice is steeped with commercial interests.*

Behring *has patented his diphtheria antitoxic serum on the Continent; Koch for years has made a princely royalty out of his tuberculin.* Little Denmark has boomed her butter trade through tuberculin, and we, in this country, it seems to me, can not accept the gospel of prevention and cure except as it it preached in Paris, Berlin, Vienna, Lille, or other Continental schools.

VIVISECTION.

[Extracts from an address delivered at the meeting of the American Academy of Medicine, Atlanta, May 2, 1896, by Geo. M. Gould, M. D., now editor of the Philadelphia Medical Journal.]

Recently one of the best scientific men in America said to me: "I would make thousands of animals suffer the most atrocious torments for a thousand years if thereby a human being could be spared one pain." This was said by one who is a physician—one not himself a vivisector, and one who is a particularly moral and gentle-mannered

man. There was, however, a certain peculiar emphasis and even passionateness in his manner when he said this that betrayed the subconscious feeling that he was exaggerating. It seemed to me a noteworthy and significant utterance. * * *

THE LIMITATIONS AND ERRORS OF THE VIVISECTIONISTS.

The first that strikes one is an exaggeration of the importance and extent of the vivisection method. As valuable an aid as it is, it is not the only, and perhaps it is not the chief, method of ascertaining medical truth. It has without doubt often been used when other methods would have been productive of more certain results. This has arisen from what a large and broad culture of the human mind perceives to flow from a recent and rather silly hypertrophy of the scientific method, and a limitation of that method to altogether too material or physical aspects of the problem. * * *

Almost every point over which the controversy has raged most fiercely has been in relation to one or all of the three or four questions:

1. What is a vivisection experiment?
2. By whom should it be performed?
3. For what purpose should it be performed?
4. By what methods should it be carried out?

In reference to all of these questions, scientific men should unite and establish a common set of principles or answers. In my judgment their failure to do so at all, and besides this, their frequent exaggeration of logical limits and just claims, has been one of the unfortunate causes of useless and wasteful wrangling. * * *

(2) I believe scientific men have made a grave mistake in opposing the limitations of vivisection (not mortisection) experimentation to those fitted by education and position to properly choose and properly execute such experimentations. No harm can come, and I believe much good would come, from our perfect readiness to accede to, nay, to advocate, the antivivisection desire to limit all experimentations to chartered institutions or to such private investigators as might be selected by a properly chosen authority. * * * At present the greatest harm is done true science by men who conduct experiments without preliminary knowledge to choose, without judgment to carry out, without true scientific training or method, and only in the interest of vanity. It takes a deal of true science and patience to neutralize with good and to wash out of the memory the sickening, goading sense of shame that follows the knowledge that in the name of science a man could, from a height of 25 feet, drop 125 dogs upon the nates (the spine forming a perpendicular line to this point) and for from forty-one to one hundred days observe the results until slow death ended the animals' misery. While we have such things to answer for, our withers are surely not unwrung, and in the interest of science, if not from other motives, we have a right to decide who shall be privileged to do them.

I have adduced this single American experiment, but purposely refrain from even mentioning the horrors of European laboratories. This is not because I would avoid putting blame where it belongs, but because such things are peculiarly prone to arouse violent language and passion, clouding the intellect and making almost impossible a desirable judicial attitude of mind. The Teutonic race is to be congratulated that it is guilty of at least but few examples of the atrocities that have stained the history of Latin vivisection, and before which, as before the records of Roman conquest and slavery, or of the "Holy inquisition," one shud-

ders at the possibilities of mental action in beings that bore the human form and feature.

Vivisection is out of place in the public schools. In the interests of pedagogy, as well as for the benefit of the pupil's morality as for the promotion of true science, scientific men should oppose with a common voice any such caricature and subversion of their aims and methods. Children should not, of all things in the world, "be familiarized with the sight of blood." [It strikes us of all men physicians should be foremost and most emphatic in their denunciation of vivisection in the public schools or in any schools except those for adults and those especially devoting themselves to medical or biologic science. The matter would hardly seem to need argumentation. Every right-minded person must know and doubtless must painfully remember in his own case, how callous children are to suffering, even how verily diabolic they often are as tormentors of animals over which they have power. It would also seem perfectly plain that the practice of vivisection before or by such highly imitative beings would have one certain effect, to increase enormously the already thoughtlessly or consciously cruel tendency of their natures.]

3. The true object, the principal if not the only one, of vivisection should be the eliciting of new truth. To this end also one may sacrifice by painless death as many animals as he pleases, so long as the extermination of no species is threatened. * * * One may painlessly kill animals, also, in order by further experiment to acquire manipulative or surgical skill and for didactic purposes in medical or scientific schools. Death of plenteous and prolific animals is *per se* no evil and can not be legislated against or morally forbidden; and the same rule will hold as regards all painless vivisection. But I believe that the most enlightened judgment and feeling of the world will not justify much or any severe sentisection (painful vivisection) for didactic purposes or for the acquirement of operative technic. In the interests of science again, as well as of morality, scientific men should set their faces sternly against such things.

4. The proper method of using animals for experimental purposes should combine scientific seriousness and rigor with the tenderest kindness to the animals. There is a subtle and beautiful law of psychology that only the unity of right object and careful method is productive of good results. Matter and manner must go hand in hand. Morality is a part of intellect and a large part. When you see a vivisector pretending to be scientific, but whose every act and word indicates brutality to his fellowmen, the politician, the selfish schemer, vulgarity of mind, and banality of manner, rest assured his laboratory experiment is vitiated with falsehood and error, and scientifically is utterly valueless.

To jeer at and deride "sentimentality" while pretending to be working for the good of humanity is hypocritic and flagrant self-contradiction. This attitude of mind on the part of a few men does more to arouse the indignation of opponents than any cruelty itself. Scientific men should root out of their ranks such poor representatives. They are enemies in the scientific household. Dr. Klein, a physiologist, before the royal commission, testified that he had no regard at all for the sufferings of the animals he used, and never used anæsthetics except for didactic purposes, unless necessary for his own convenience, and that he had no time for thinking what the animal would feel or suffer. It may be denied, but I am certain a few American experimenters feel the same way and act in accordance with their feelings. But they are

not by any means the majority, and they must not only be silenced, but their useless and unscientific work should be stopped. They are a disgrace both to science and humanity. * * *

And this brings me to what I can but conceive as a grave and profound mistake on the part of the experimentalists—their secrecy. A truly scientific man is necessarily a humane man, and there will be nothing to conceal from the public gaze of anything that goes on in his laboratory.

It is a mistake to think our work can not bear the criticism of such enlightened public sentiment as exists here and now; if there is necessary secrecy, there is wrong. People generally are not such poor judges as all that. * * * I would go even further. Every laboratory should publish an annual statement setting forth plainly the number and kind of experiments, the objects aimed at, and most definitely the methods of conducting them. At present the public somewhat ludicrously but sincerely enough grossly exaggerates the amount and the character of this work, and by our foolish secrecy we feed the flame of their passionate error. An organized, systematic, and absolute frankness, besides self-benefit, would at once, as it were, take the wind out of our opponents' sails. Do not let us have "reform forced upon us from without" in this contention, but by going more than half way to meet them, by the sincerest publicity, show that as well as scientists and lovers of men we are also lovers of animals. Faith, hope, and love—these three. To faith in knowledge, to hope of lessening human evil, we add love—love of men, and of the beautiful living mechanisms of animal bodies placed in our care.

As it appears to me, this most unfortunate controversy, filled with bitterness, misrepresentation, and exaggeration, is utterly unnecessary. Both of the sharp-divided, hate-filled parties are at heart, if they but knew it, agreed upon essentials and furiously warring over nonessentials and errors. I frankly confess that one side is about as much at fault as the other, and that the whole wretched business is a sad commentary upon the poverty of common charity and good sense. * * *

Can not we ignore the ranters and extremists of both parties, behave like decent folk, get together, strike a balance sheet of our common follies and common excellencies, and find at last that we are very much alike, and, indeed, have no real quarrel?

[*In presenting these unconnected extracts from Dr. Gould's admirable address, the compiler would particularly call attention to the fact that they present but one aspect of his views regarding vivisection. Dr. Gould is a strong advocate of animal experimentation, and for a complete statement of his opinions the entire address (included in a recently published volume entitled Borderland Studies) should be read. If the judicial attitude evinced by the closing paragraph were more prevalent in the medical profession than it apparently is, the questions pertaining to vivisection would not be far from solution.*]

ON VIVISECTION.

[Extracts from the annual address before the American Academy of Medicine, Washington, May 4, 1891, by Prof. Theophilus Parvin, M. D., LL. D., of Jefferson Medical College, Philadelphia, Pa., president of the Academy.]

The subject of bacteriology has, I believe, undue importance in professional study and teaching. * * * May not a similar statement be made in regard to vivisection? My belief is that the value of this method of study in relation to surgery and therapeutics has been exaggerated. So far as the first department is concerned, reference will be

made to abdominal and to brain surgery. If Mr. Tait's statement is accepted—and his authority and ability none can justly question—vivisection has been an injury, not a help, to the former. His declarations upon this point have been positive and frequent. One of the most recent, 1889, is as follows: "*Instead of vivisection having in any way advanced abdominal surgery, it has, on the contrary, retarded it.*"

Those engaged in brain surgery sometimes refer to the great advantages obtained by vivisection in cerebral localization, but Dr. Seguin, whose authority will be admitted, referring to a paper by Horsley, makes the following statements: "The author appears to assume that our progress in cerebral localization has been mainly dependent upon experimentation. Here again we must differ from him. Clinical observation and pathological data come first (Broca for speech center, Hughlings-Jackson for a hand center and general doctrine), the animal experiments with detailed proofs by Hitzig, Ferrier, and others long after; and the solid facts upon which we make our daily localization diagnoses have been patiently accumulated by pathologists, and would stand to-day supporting the doctrine of cerebral localization if not one animal's brain had been touched. Besides, in the case of the visual half center human pathological facts have overthrown the result of experimentation (Ferrier's angular-gyrus center), and have made us, for practical purposes, indifferent to the contradictory results of Munk and Goltz. It is safe to say that every one of the so-called 'centers' in the human brain have been determined empirically by post-mortem proofs independently of experimental data. What animal experiments would have led us, for example, to locate the half center for ordinary vision in the cuneus, the center for the leg in the paracentral lobule, and that for audited language in the left first temporal gyrus? In this department of pathology medical science has been strictly inductive and sufficient unto itself, though receiving confirmatory evidence from the physiologist. The first (speech) and the last (visual) centers have been discovered by clinical and pathological studies."

Facility in operating is one of the advantages claimed for vivisection, and the claim is just. Nevertheless, the animals thus used for the education of the surgeon *ought to be completely anæsthetized during operations, and killed immediately after, and not left to live days of suffering.* Moreover, it should be remembered that great surgeons have made their work intelligent and facile by operations upon the human cadaver; the glory of many of our country's dead surgeons has never been eclipsed by any of those now living, no matter how much time they have given to vivisection.

What shall be said of the value of experimental therapeutics? The shortest and most positive answer is that given by one of the highest French authorities, Dujardin-Beaumetz: "Experimental therapeutics exist only in name, and will continue nominal until we are able to create at will in animals the diseases common to mankind."

The famous Hyderabad commission, after killing hundreds of animals, chiefly dogs, by chloroform anæsthesia, concluded that death occurred from asphyxia, and never from syncope; and therefore in the administration of chloroform as an anæsthetic to human beings the respiration only need be observed. Dr. Richardson shows that the inference is erroneous, stating that "its first failure arises from the fact that the reasoning soul, as Thomas Willis calls it, is left out of the argument." Not only this, but equally able and eminent experimenters with those concerned in the Hyderabad investigations have shown that dogs may, when killed by chloroform inhalation, perish from syncope, or

from syncope and asphyxia, instead of from the latter only. Differences of climate and differences of dogs have been suggested as explaining these different results. Who shall compose these strifes? *What uncertainties may belong to investigations made by the most skillful, and how unwilling should medicine be to accept all conclusions of the laboratory as certain truth!*

Medicine does not accept in all cases such conclusions. For example, doctors, relying upon clinical experience, give certain mercurials to excite the hepatic secretion; but this practice ought to have been abandoned long ago when the experiments of Rutherford proved that in dogs no such result followed. Imagine the experimental therapeutist giving a patient a dose of calomel, who innocently asks, "Is thy servant a dog, that this drug is given me?" The doctor, of course, can reply, though the imperfection of his method is thus confessed, "No; it is because you are not a dog that I prescribe it."

Some two years since, Herbert Spencer having suggested to Huxley that in case he were sick he would employ a practitioner who trusted in the teaching of experimental therapeutics, the latter replied, "Heaven forbid that I should fall into that practitioner's hands; and if I thought any writings of mine could afford the slightest pretext for the amount of manslaughter of which that man would be guilty, I should be sorry indeed."

When one reads the experiments made upon animals with some well-known remedies, very probably he finds no addition of a practical sort to his knowledge; he learns nothing as to when, in what doses and intervals, the medicines are to be administered. Digging post holes and fixing posts in them will define boundaries, but do not make a fruitful orchard.

When we consider that drugs do not act upon man invariably as they do upon inferior animals, nor when thus acting they may not in corresponding doses; and that animals differ among themselves as to susceptibility; and that, finally, these animals are not suffering from the diseases for which, in the human subject, the remedies are to be given, not indeed afflicted with any disease, *it must be obvious that there are sources of fallacy inherent in the method, and that false conclusions may result.*

Whether the good outweighs the evil, whether the profit in this business is greater than the loss, must be finally decided, not by ardent vivisectionists who are liable to become intolerant and aggressive, nor by zealous antivivisectionists who may exalt sentiment above knowledge and reason, but by the calm, continued observation and experience of conscientious, intelligent practitioners.

It seems to me that the most valuable result of experiments upon animals has been in the discovery of the etiology of so-called septic infection; and hence the means, whether aseptic or antiseptic, by which this great evil may be usually averted.

Pasteur's investigations as to the cause of hydrophobia and the employment of preventive inoculations require longer observation and experience for appreciation. Koch's method of cure of tuberculosis rates much lower than it did a few months ago. *It is not beyond the bounds of possibility that before many years the average results from antihydrophobic and antituberculous inoculations will be of such an unfavorable character that they will give one of the strongest arguments against vivisection.*[1]

[1] This was written in 1891. Before 1895, the "antituberculous inoculations" were *given up.*

There are certain presumptive arguments against vivisection. If there be a God of love and power, without whose knowledge not even a sparrow falls to the ground—a God who giveth to the beast his food and to the young ravens which cry; who is good to all, and whose tender mercies are over all His works—surely it is not in accordance with His character and purposes that animals should undergo cruel tortures for man's benefit.

The animal creation has been made subject to man; many of them are our dependents, and some are capable of the strongest attachment to human beings and become the most devoted friends. Even the wild animal sometimes appeals in its distress for human help.

What might not all animal creation become to man if everywhere the law of kindness ruled his action! Physicians, whose very name points to widest sympathy with nature, ought to be the chief apostles in preventing cruelty and proclaiming kindness to animals as the duty of man, and therefore must take heed lest the power of their apostleship be weakened by needless, useless, and painful vivisections; for preaching and practice coincide, if good effect comes from the former.

The attitude toward vivisection taken by some of the best men of the age is assuredly very hostile. For example, three of the greatest poets of the century—Tennyson, Robert Browning, and Whittier—have condemned it. Chief Justice Coleridge, Phillips Brooks, and Morgan Dix are other illustrious men that have given severe censure. Robert Browning, a few years before his death, said: "*But this I know, I would rather submit to the worst of the deaths, so far as pain goes, than have a single dog or cat tortured under the pretense of saving me a twinge or two.*" Morgan Dix, in the course of a letter written upon this subject last year, uses the following language: "I have read accounts of the tortures inflicted in the name of science on the creatures committed to our care or placed in our power by a Divine Providence, and they have made me sick at heart for weeks together. I shall never peruse these frightful statistics again. *I have read what arguments are made in extenuation or recommendation of the practice, and their only effect has been to strengthen my conviction that man is capable of becoming the most barbarous and most merciless of all agents.*"

It is wise for physicians interested in vivisection to recognize that there is on the part of prominent women and men in the laity a strong sentiment of antagonism to experiments upon animals; and therefore they should avoid all such work not promising certain benefit to man, and anæsthetics ought always to be employed. I sometimes fear that the anæsthesia is frequently nominal rather than real, else why so many and ingenious contrivances for confining the animal during operations—contrivances that are not made use of in surgical operations upon human beings, their immobility being secured by profound anæsthesia.

Should the law restrict the performance of vivisection? I think it ought, chiefly as an expression of public sentiment and for the moral effect, for violations of its provisions could usually only be discovered by a system of espionage, by the employment of detectives, of spies, and informers, utterly alien to our system of government, and who are, as a rule, abominable.

That restriction ought to forbid all experiments upon animals made without worthy objects; and in every case, so far as possible, the animal during and subsequent to the operation must be preserved from pain. Original investigations, very often a euphemism for vivisections, may seem quite fascinating to the young medical student, and possibly he thinks thereby

to find a short road to fame; the result frequently remains in the embryonic condition of manuscript read chiefly, if not exclusively, by the author. But such investigations ought not to be made except under the directions of a qualified and conscientious teacher, who will see that they have a reasonable probability of usefulness, and that they are conducted so that no pain or the least possible pain is inflicted. Vivisection is in more danger from ignorant, rash, and reckless experimenters than from those directly hostile to it. I can not think that vivisections done for teaching purposes, simply showing what has been proved time and again upon hundreds and thousands of victims, are justifiable, unless anæsthesia is employed not merely to mitigate but completely to abolish suffering of the animals. If the rule just mentioned is not observed, *the influence of such experiments is injurious both to the operator and to the witnesses of the operation.*

SCIENTIFIC CHICANERY.

[Extracts from document published by the American Humane Association.]

In the Senate report on vivisection, issued in 1896, there appears a "statement in behalf of science," signed by some forty American vivisectors or investigators, asking in effect that the practice of animal experimentation be continued free from Government supervision or control. To increase the importance of this manifesto it was introduced to the public by a special letter, signed, among others, by Dr. Charles W. Eliot, the president of Harvard University, vouching for it as a statement which "may be accepted as an authoritative expression of expert opinion." Its opening sentences were as follows:

"So long ago as the autumn of 1866 there were published in New York denunciations of the practice of making upon living animals those scientific observations and experiments which are commonly called vivisections. During the following twenty-nine years there have appeared from time to time similar denunciations, more or less sweeping and violent. Of these some condemn vivisection altogether, and others in various of its phases. Some call for its total abolition, and others for its material restriction. Some are labored essays, and others are brief 'tracts' or 'leaflets,' intended more easily to arrest the attention. * * * *In these publications, too, there often figure extracts from scientific writings, and in many cases these extracts are so garbled that only ignorant or reckless animosity could be accepted in excuse for their seeming bad faith.*"[1]

Among the signatures to this document were the following names:

S. Weir Mitchell, M. D., Philadelphia, Pa., member of the National Academy of Sciences.

J. G. Curtis, M. D., professor of physiology, College of Physicians and Surgeons, Columbia College, New York.

W. H. Howell, M. D., professor of physiology, Johns Hopkins Univerity, Baltimore, Md.

H. P. Bowditch, M. D., professor of physiology, Harvard Medical School, Harvard University, Boston, Mass.

W. T. Porter, M. D., assistant professor of physiology, Harvard Medical School, Harvard University, Boston, Mass.

J. W. Warren, M. D., associate professor of physiology, Bryn Mawr College, Byrn Mawr, Pa.

R. H. Chittenden, Ph. D., professor of physiological chemistry, Yale University, New Haven, Conn.

[1] *Fifty-fourth* Congress, Report 1049, p. 57. Italics ours.

V. C. Vaughan, M. D., professor of hygiene and physiological chemistry, Medical Department of Michigan University, Ann Arbor, Mich.

John Marshall, M. D., assistant professor of chemistry, University of Pennsylvania, Philadelphia, Pa.

S. C. Busey, M. D., president of the Medical Society, District of Columbia.

Henry M. Lyman, M. D., professor of principles and practice of medicine, Rush Medical College, Chicago, Ill.

E. J. Janeway, M. D., late professor of principles and practice of medicine, Bellevue Hospital Medical College, New York, N. Y.

Ch. Wardell Stiles, Ph. D., zoologist, Bureau of Animal Industry, United States Department of Agriculture.

William Patten, Ph. D., professor of biology, Dartmouth College.

William T. Sedgwick, M. D., professor of biology, Massachusetts Institute of Technology, Boston, Mass.

H. C. Ernst, M. D., professor of bacteriology, Harvard Medical School, Harvard University, Boston, Mass.

Theobald Smith, M. D., professor of applied zoology, Bussey Institute, Harvard University, Cambridge, Mass.

A. C. Abbott, M. D., University of Pennsylvania, Philadelphia, Pa.

J. J. Abel, M. D., professor of pharmacology, Johns Hopkins University.

H. C. Wood, M. D., professor of materia medica and therapeutics, University of Pennsylvania, Philadelphia, Pa.

Harrison Allen, M. D., professor of zoology and comparative anatomy, University of Pennsylvania, Philadelphia, Pa.

G. A. Piersol, M. D., professor of anatomy, University of Pennsylvania, Philadelphia, Pa.

C. S. Minot, S. D., professor of histology and embryology, Harvard Medical School, Harvard University, Boston, Mass.

Henry F. Osborn, M. D., professor of biology, Columbia College, New York.

C. O. Whitman, Ph. D., professor of zoology, University of Chicago.

William H. Welch, M. D., professor of pathology, Johns Hopkins University, Baltimore, Md.

T. M. Prudden, M. D., professor of histology and pathology, Columbia College, New York.

R. H. Fritz, M. D., professor of theory and practice of medicine, Harvard Medical School, Harvard University, Boston, Mass.

George M. Sternberg, M. D., Surgeon-General United States Army.

J. Rufus Tryon, M. D., Surgeon-General United States Navy, Washington, D. C.

Walter J. Wyman, M. D., Surgeon-General United States Marine-Hospital Service, Washington, D. C.

Daniel E. Salmon, D. V. M., Hon. A. R. C. V. S., Chief of Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C.

W. W. Keen, M. D., professor of principles of surgery and clinical surgery, Jefferson Medical College, Philadelphia, Pa.

William Osler, M. D., professor of clinical medicine, Johns Hopkins University, Baltimore, Md.

The signers of this manifesto admit that they could not hope "to make any statement" which would not be denounced as "false." This is hardly a reputation which men in general desire to proclaim to the world. Doubtless, there were good reasons for that conscious distrust.

Let us clearly understand the matter. The modern controversy over

vivisection has been going on for over a third of a century. That no imperfect quotation has ever been made by the opponents of unlimited experimentation, either in Europe or America, would be too much to assert. Nearly ten years since, an English lady compiled a work, under the somewhat suggestive title of "The Nine Circles," which was intended to illustrate certain phases of vivisection. In describing experiments which lasted for hours, or days, or months, the compiler did not always mention that in certain cases the initial operation, lasting sometimes but a few minutes, was performed under anæsthetics; and for this and a few like omissions, the work was severely denounced by one of the leading vivisectors of Great Britain, as misleading and unfair.

The book thus criticised was immediately withdrawn from circulation. How little its intrinsic reliability was affected is shown by the fact that the omissions were immediately supplied and the book again brought out with an introduction by Dr. Edward Berdoe, a leading London physician. More than a quarter of a century ago, in September, 1874, the late Henry Bergh, writing to the New York Tribune, quoted from Brown-Sequard the statement that in certain vivisection the result of incisions was "all guesswork," omitting to add that after death of the animal anatomical observations removed the uncertainty of the vivisection. The omission was not very important; still, it was one that would not have occurred under a more careful adherence to verbal accuracy. But neither of these two cases can have had anything to do with the imputations made. One was a book printed in England ten years since, the other a hasty newspaper letter published twenty-five years ago. Neither as "essays" or "leaflets" or "tracts" can they have been referred to by the forty scientists as "*the many cases*" in which extracts from scientific writings are chargeable with intentional inaccuracy.

The important question, therefore, that confronts us is simply this: Did these forty "scientists" tell the truth in the passage that has been cited from their "Statement in behalf of science?" The literature of protest against the atrocities and cruelties of vivisection abounds, as they say, with quotations from the writings of scientific men. The vast majority of those who question the morality of the unlimited vivisection now going on in America and the Continent of Europe base their doubts or their convictions upon the accuracy and reliability of this evidence. May it all be dismissed by an accusation like this, put forth without a particle of proof? Is it true or is it false that "in many cases" these quotations are so garbled as only to suggest bad faith and reckless animosity? This is a very simple question. It is determinable by evidence. But one conclusion is possible. Each of the men who put his name to that document "in behalf of science" either possessed evidence of the truth of the assertions he was making, or else he signed it knowing that he was lending his name and influence to a charge *for which he had no proof whatever and which might be false.* If such evidence was in his possession, we should expect its production immediately its existence was questioned. If he had no such evidence, *then every signer of that charge was guilty of a false statement, of an act of perfidy to scientific truth.* There are gradations in dishonor; there are offenses for which even "reckless animosity" is no excuse.

At the convention of the American Humane Association, held in Washington, D. C., in December, 1898, it was felt that this charge—so injurious even if false—ought not to pass unchallenged. Simply to denounce it as untrue was deemed not enough; every signer of that *document should* have the matter brought directly to his personal notice,

and a request made him for whatever evidence was in his possession. The following resolution was unanimously adopted December 16, 1898:

"Whereas in the Senate Report No. 1049, concerning vivisection, there appears 'A statement in behalf of science,' bearing, among other well-known signatures, the names of George M. Sternberg, M. D., Surgeon-General, United States Army; Daniel E. Salmon, doctor of veterinary medicine, United States Department of Agriculture; Charles Wardell Stiles, Ph. D., of the same Department, and S. C. Busey, M. D., president of the medical society, Washington, D. C.; and

"Whereas in its reference to various leaflets and pamphlets issued by some of our constituent societies regarding the practice of vivisection, this manifesto makes a most serious imputation, alleging that 'In these publications, too, there often figure extracts from scientific writings, and in many cases these extracts are so garbled that only ignorant or reckless animosity could be accepted in excuse for their seeming bad faith;' and

"Whereas this charge, absolutely unsupported by any evidence whatever, constitutes a most grave aspersion upon the honor, veracity, and good faith of some of our constituent societies; and

"Whereas this association is unwilling to believe that allegations, so dishonoring to their authors, if untrue, can have been heedlessly and maliciously made by scientific men of such eminence, without their having at hand at least some apparent proofs of their charges; therefore, be it

"*Resolved*, That the American Humane Association hereby respectfully, but emphatically protests against the putting forth of such imputations without production of the evidence upon which they rest; and it therefore requests each and every signer of this 'Statement in behalf of science' (and especially each of the signers above named, who is in Government employ), to furnish the secretary of this association with a reference to some few of these 'many' extracts from scientific writings concerning vivisection which he claims to have been 'garbled;' accompanying such reference with an exact quotation of the words or phrases which have been so altered or omitted as to have materially changed, or distorted the meaning of the writer thus cited."

To each signer of the "Statement in behalf of science" a printed copy of this resolution was sent, together with the following letter from the secretary of the American Humane Association:

FALL RIVER, MASS., *January 21, 1899.*

DEAR SIR: I have been directed to ask for proof, or for any evidence in your hands, of the charges made by you over your published signature, and referred to in the accompanying resolution.

An early reply will oblige yours, very truly,

FRANCIS H. ROWLEY,
Secretary.

The responses to this request have been precisely as might have been anticipated where the signers had no proof of the imputations they had made. Charles Wardell Stiles, of the Bureau of Animal Industry, Washington, and calling himself a "scientific attaché of the United States embassy"—whatever that may be—wrote from Berlin, Germany, March 3, 1899, that his private library being in storage, he was unable to comply with the request. He intimated willingness to furnish some evidence of the sort on his return to Washington, but no further word from him has been received. The private secretary of Dr. S. Weir Mitchell wrote under date of January 23, 1899, that Dr.

Mitchell was "in Europe for the winter," and that she was not permitted to send him any notes upon matters of business outside of his profession. No further response from Dr. Mitchell has been received. It is not generally known that Dr. S. Weir Mitchell, whose name is now so well known as a novelist, was, some thirty years ago, one of the leading vivisectors of the United States.

The Surgeon-General of the United States Army wrote as follows:

WAR DEPARTMENT,
SURGEON-GENERAL'S OFFICE,
Washington, D. C., January 26, 1899.

Mr. FRANCIS H. ROWLEY,
Fall River, Mass.

DEAR SIR: I am so very much occupied by my official duties that I am unable at present to give any further attention to your communication of January 21. I hope, however, to be able to do so at some future time.

Very truly, yours,
GEORGE M. STERNBERG,
Surgeon-General United States Army.

No further communication from General Sternberg has been received. It is highly probable that if the Surgeon-General could have referred to a few facts in support of the charge he had made over his official signature, he would have found the necessary moments of leisure during the year that has elapsed.

Dr. W. W. Keen, of Jefferson Medical College, Philadelphia, wrote as follows:

1729 CHESTNUT STREET,
Philadelphia, February 4, 1899.

MY DEAR SIR: In reply to your letter received a few days ago, I beg to say that a suitable reply will be prepared and forwarded to you in due time.

Yours, very truly,
W. W. KEEN.

Nine months have gone by since that letter was received, and we still await the "suitable reply."

Prof. R. H. Fitz, M. D., of Harvard Medical School, Harvard University, wrote thus:

18 ARLINGTON STREET.

FRANCIS H. ROWLEY, Esq., Secretary.

DEAR SIR: I have referred your letter of the 21st instant to one of the committee having in charge the preparation of the document referred to.

Yours, sincerely,
R. H. FITZ.

BOSTON, *January 23, 1899.*

In other words, Professor Fitz, of Harvard University, having no evidence whatever of the imputation to which he had affixed his name, fancies that he can now wash his hands of all responsibility for the falsehood by passing the request over to the men who phrased it, whom he does not name.

Prof. Charles S. Minot, S. D., of Harvard Medical School, Harvard University, writes, without date, the following astounding communication:

DEAR SIR: To cite only one instance: Mr. Peabody, formerly, I have *been told, president* of the Anti-Vivisection Society of Boston, made

before the committee of the Massachusetts legislature the most impudent, outrageous, and baseless accusations against officers of the Harvard Medical School in my hearing. When cross-questioned he had not the faintest, most remote, or trifling foundation for any of his accusations, and only demonstrated that he was guilty of deliberate misrepresentations.

CHARLES S. MINOT.

Considering its source, this is a most extraordinary epistle. The writer is a man of science, yet his letter violates almost every rule of scientific precision. Professor Minot had affixed his name to a charge that in the various publications put forth by the critics of vivisection there were "*in many cases*" garbled quotations from scientific writings. He is respectfully asked for the evidence upon which he had made that accusation. Instead of quoting a line, or giving a single reference to the "many cases," he tells us, with a childlike simplicity, that he once heard Mr. Peabody make a speech against himself and his associates of the Harvard Medical School, which speech he forthwith proceeds to denounce. Is it possible that Professor Minot, as a scientific man, really believed that, in citing from memory a speech of Mr. Peabody, he was giving proof that garbled "extracts from scientific writings" had been made in certain *publications?* Is this the kind of scientific precision which is taught by vivisection in the laboratories of Harvard University?

Here, then, is the result. Of the forty experts in scientific accuracy who so solemnly affixed their signatures to this calumny, but six made any reply when called upon for proof, and *not one furnished a single line of evidence in support of his statement.* Their charge was false. The man who phrased it doubtless knew it was false. The men who sent it forth to the world knew that whether true or untrue, *they*, at least, had no proofs of the imputation to which they lent the authority of their names. It is simply another instance of the utter unreliability of scientific men when, leaving legitimate fields of inquiry, they enter the arena in defense of pursuits and practices linked to cruelty and vice, and impeached to-day by the moral sentiment of mankind.

At the annual convention of the American Humane Association, held in Columbus, Ohio, September, 1899, the following resolution was adopted without a dissenting voice:

"Whereas at the last annual meeting of the American Humane Association, held at Washington, D. C., in December, 1898, attention was called to a document issued by the United States Senate, containing a 'statement' signed by men eminent as professional men, or as experts in the practice of vivisection, and vouched for by the president of Harvard University and others as 'An authoritative expression of expert opinion;' and

"Whereas referring to the various publications concerning vivisection which from time to time have appeared, this so-called 'Statement in behalf of science,' meets argument by the imputation of dishonesty, alleging that: '*In these publications there often figure extracts from scientific writings, and in many cases these extracts are so garbled that only ignorant or reckless animosity could be accepted in excuse for their seeming bad faith;*' and

"Whereas this association, protesting against such injurious imputations without production of a particle of evidence of their truth, directed its secretary to request from each individual signer of this

statement some reference to the 'many' proofs upon which the charge was professedly made; and

"Whereas in accordance with this authorization the secretary, in January, 1899, asked for such evidence from Surgeon-General Sternberg, United States Army; from Daniel E. Salmon, and Charles Wardell Stiles (all in the employ of the United States Government), and made the same request by personal letter to each of the other signers of this document, without obtaining from a single individual reference to one 'garbled' extract from scientific writings; and

"Whereas this result proves that most eminent scientists are not above affixing their names to public 'statements in behalf of science' which they did not promptly substantiate, and of the truth of which, so far as concerns America, apparently they never had the slightest evidence: Therefore,

"*Resolved*, I. That the American Humane Association hereby records its emphatic condemnation of this apparent falsehood. It believes that science rightly understood means only the simple truth; that just criticism of any method of scientific inquiry is entirely legitimate and right, and that no exposure of the abuses of vivisection, however unwelcome, can ever justify a falsehood in their defense, or make mendacity a scientific privilege.

"*Resolved*, II. That this association does not assert that in course of this controversy over the abuses of animal experimentation—a controversy extending over a quarter of a century, and involving Europe even more than America—no errors or mistakes have ever been made. It does, however, most confidently affirm that no 'garbled' extracts from scientific writings, implying a different sense and purport from that of the authors quoted, can be pointed out in any publication, tract, or pamphlet issued by its authority. It believes that not only regarding vivisection, but always and everywhere, the exact truth is of supreme importance; that what we need is not the secrecy of the laboratory, but ever 'more light,' and that even from opponents all criticism should be welcome when it is based on truth."

CONFESSIONS OF A VIVISECTOR.

[A letter to the London Morning Post, by Dr. George Hoggan.]

SIR: If the Society for the Prevention of Cruelty to Animals intends to give effect to the memorial presented to it on Monday, and do its utmost to put down the monstrous abuses which have sprung up of late years in the practice of vivisection, it will probably find that the greatest obstacle to success lies *in the secrecy with which such experiments are conducted; and it is to the destruction of that secrecy* that its best efforts should be directed.[1] So long as the present privacy be maintained it will be found impossible to convict, for the want of evidence. No student can be expected to come forward as a witness when he knows that he would be hooted from among his fellows for doing so, and any rising medical man would only achieve professional ruin by following a similar course. The result is that, although hundreds of such abuses are being constantly perpetrated among us, the public knows no more about them than what the distant echo

[1] Dr. George M. Gould, editor of Philadelphia Medical Journal, in his address before the American Medical Association, made the same criticism regarding American vivisection: "This brings me to what I can but conceive as a grave and profound mistake on the part of the experimentalists—*their secrecy*."

reflected from some handbook for the laboratory affords. I venture to record a little of my own experience in the matter, part of which was gained as an assistant in the laboratory of one of the greatest living experimental physiologists. [It was that of Claude Bernard, in Paris.]

In that laboratory we sacrificed daily from one to three dogs, besides rabbits and other animals, and after four months' experience, I am of opinion that not one of those experiments on animals was justified or necessary. The idea of the good of humanity was simply out of the question, and would have been laughed at; *the great aim being to keep up with, or get ahead of one's contemporaries in science*, even at the price of incalculable amount of torture needlessly and iniquitously inflicted on the poor animals. During three campaigns I have witnessed many harsh sights, but I think the saddest sight I ever witnessed was when the dogs were brought up from the cellar to the laboratory for sacrifice. Instead of appearing pleased with the change from darkness to light, they seemed seized with horror as soon as they smelt the air of the place; divining, apparently, their approaching fate. They would make friendly advances to each of three or four persons present, and as far as eyes, ears, and tail could make a mute appeal for mercy eloquent, they tried it in vain. Even when roughly grasped and thrown on the torture trough a low complaining whine at such treatment would be all the protest made, and they would continue to lick the hand which bound them, till their mouths were fixed in the gag, and they could only flap their tails in the trough as the last means of exciting compassion. Often when convulsed by the pain of their torture this would be renewed, and they would be soothed instantly on receiving a few gentle pats. It was all the aid and comfort I could give them, and I gave it often. They seemed to take it as an earnest of fellow-feeling that would cause their torture to come to an end—an end only brought by death.

Were the feelings of experimental physiologists not blunted they could not long continue the practice of vivisection.[1] They are always ready to repudiate any implied want of tender-feeling, but I must say that they seldom show much pity; on the contrary, in practice they frequently show the reverse. Hundreds of times I have seen, when an animal writhed with pain and thereby deranged the tissues during a delicate dissection, instead of being soothed it would receive a slap and an angry order to be quiet and behave itself. At other times, when an animal had endured great pain for hours without struggling or giving more than an occasional low whine, instead of letting the poor mangled wretch loose to crawl painfully about the place, in reserve for another day's torture, it would receive pity so far that it would be said to have behaved well enough to merit death; and, as a reward, would be killed at once by breaking up the medulla with a needle, or "pithing," as this operation is called. I have often heard the professor say, when one side of an animal had been so mangled and the tissues so obscured by clotted blood that it was difficult to find the part searched for, "Why don't you begin on the other side?" or "*Why don't you take another dog? What is the use of being so economical?*" One of the most revolting features in the laboratory was the custom of giving an animal, on which the professor had completed his experiment, and which had still some life left, to the assistants to practice the finding of arteries, nerves, etc., in the living animal, or for performing what are called fundamental

[1] "It is an unjust reflection upon those engaged in scientific research-work to suppose they are less humane than other members of the community."—*Surg.-Gen. Sternberg*, [Senate Report 1049, p. 41].

experiments upon it—in other words, repeating those which are recommended in the laboratory handbooks.

I am inclined to look upon anæsthetics as the greatest curse to vivisectible animals. They alter too much the normal conditions of life to give accurate results, and they are therefore little depended upon. *They, indeed, prove far more efficacious in lulling public feeling toward the vivisectors than pain in the vivisected.* Connected with this there is a horrible proceeding that the public probably knows little about. An animal is sometimes kept quiet by the administration of a poison called curare, which paralyzes voluntary motion while it heightens sensation, the animal being kept alive by means of artificial respiration.

I hope that we shall soon have a Government inquiry into the subject, in which experimental physiologists shall be only witnesses, not judges. *Let all private vivisection be made criminal and all experiments be placed under Government inspection,* and we may have the same clearing away of abuses that the anatomy act caused in similar circumstances.

I am, sir, your obedient servant,

GEORGE HOGGAN, M. B. and C. M.

13 GRANVILLE PLACE, *Portman Square, W.*

AN AMERICAN PHYSICIAN ON CLAUDE BERNARD.

[From Letter in Boston Medical and Surgical Journal, April, 1895.]

"When I was studying medicine in Paris, it was the custom of a distinguished physiologist to illustrate his lectures by operations on dogs. Some of his dissections were not very painful, but others were attended with excruciating, long-continued agony; and when the piteous cries of these poor brutes would interrupt his remarks, with a look of suppressed indignation he would artistically slit their windpipes, and thus prevent their howling. Curiosity prompted me to inquire of the janitor whether, after this period of torment, these creatures were mercifully put out of misery, and I ascertained that such animals as did not succumb to the immediate effects of their mutilations were consigned to a cellar, to be kept, unattended and unfed, until wanted for the following lectures, which occurred on alternate days. I never noticed the slightest demonstration of sympathy on their behalf, except on the part of a few American students. These dogs were subjected to needless torture for the mere purpose of illustrating well-known and accepted facts, capable of being taught satisfactorily by drawings, charts, and models. I entertain no doubt that barbarous cruelty was practiced at that time in all the Parisian physiological laboratories, though it is probable *for novel and horrible experiments none could rival the infernal ingenuity of that master demon,*—Claude Bernard."

IS VIVISECTION PAINFUL?

[From document issued by the American Humane Association.]

"As a matter of fact, anæsthetics are habitually administered in experiments which involve an amount of pain worthy of consideration." [From memorial to Congress unanimously adopted by the Medical Society of the District of Columbia. (Report, p. 129.)]

"It is an unjust reflection upon those engaged in scientific research work to suppose that they are less humane than other members of the community, and that special legislation is necessary to cause them to

administer anæsthetics to animals subjected to painful experiments." [From speech by Surgeon-General Sternberg before Senate committee, April 17, 1896. (Senate Report, p. 41.)]

What is meant by humane experimentation, and humane vivisectors, may be illustrated by the testimony of one of the most distinguished pathologists now living, Emanuel Klein, M. D., F. R. S., now lecturer on physiology at St. Bartholomew's Hospital, London. The evidence which follows is from the official shorthand notes of the Royal Commission on Vivisection. (*Italics are ours.*)

DR. KLEIN'S EVIDENCE.

[Minutes, p. 183 seq.]

3528. (Chairman.) Are you assistant professor at the laboratory of the Brown Institution?—Yes.

3538. What is your own practice with regard to the use of anæsthetics in experiments that are otherwise painful?—Except for teaching purposes, for demonstration, *I never use anæsthetics where it is not necessary for convenience.* If I demonstrate, I use anæsthetics. If I do experiments for my inquiries in pathological research, except for convenience sake, as for instance on dogs and cats, I do not use them. On frogs and the lower animals I never use them.

3539. When you say that you only use them for convenience sake, do you mean that you have no regard at all to the sufferings of the animals?—*No regard at all.*

3540. You are prepared to establish that as a principle which you approve?—I think that with regard to an experimenter, a man who conducts special research, and performs an experiment, he has no time, so to speak, for thinking what will the animal feel or suffer. His only purpose is to perform the experiment, to learn as much from it as possible, and to do it as quickly as possible.

3541. Then for your own purposes *you disregard entirely the question of the suffering of the animal in performing a painful experiment?*—I do.

3544. As an investigator, you are prepared to acknowledge that *you hold as entirely indifferent the sufferings of the animal which is subjected to your investigation?*—Yes.

3545. (Lord Winmarleigh.) Had you practiced before coming to England?—Yes; *in Vienna.*[1]

3546. Do you believe that that is a general practice on the Continent, to disregard altogether the feelings of the animals?—I believe so.

3547. Have you, since you have come to this country, had any proof of what you state now with regard to the different feeling that pervades the inhabitants of England with regard to the feelings of the animals on which you operate? Have you had any instances of the contrary feeling to that which you have just mentioned, on the part of Englishmen, since you have come to this country?—Yes; there is a great deal of difference.

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[1] LONDON, January 26, 1899.—The *Vienna* correspondent of the Morning Leader says: "It has been discovered that the physicians in the free hospitals of Vienna systematically experiment upon their patients, *especially new-born children, women who are enceinte, and persons who are dying.* A youth, who was on the high road to recovery, was inoculated, and he died within twenty-four hours. Many dying patients have been tortured by poisonous germs, and many men have been inoculated with contagious diseases. One doctor, who had received *an unlimited number of healthy children from a foundling hospital for experimental purposes,* excused himself on the ground that *they were cheaper than animals.*"

3548. You have seen it exhibited?—Yes.

3549. Would you give the commission an instance in which any such feeling has been exhibited?—I mean with regard to the journals; the outcry and agitation carried on in the different journals against the practice of vivisection. *There is no such thing abroad;* there the general public takes no view, does not claim to pronounce any criticism or any judgment about scientific teaching or physiology in general.

3553. But you believe that, generally speaking, there is a very different feeling in England?—*Not amongst the physiologists; I do not think there is.*

3563. But do you think that where it is only a question of time, a professor of physiology is not bound to consult humanitarian feelings?—I must again draw a distinction between an investigator and a professor of physiology. I understand a professor of physiology is a man who teaches, and there, I think, it is quite right before a class that when one performs an experiment one should use anæsthetics, but *an investigator has no time.* I, myself, *when I am going to make an experiment for pathological research, have no time really with regard to what the animal will feel.*

3564. Is that really the only reason you can give for not using anæsthetics?—It is to a great extent; it is the chief reason, I should say; there is no place for considering that point.

3599. (Mr. Forster.) You were stating that you considered it was so important to be absorbed upon the object of the experiment that you could think of nothing else, and therefore could not really, in your opinion, afford time to consider the feelings of the animal; do you not sometimes find an inconvenient interruption from the cries of the animal?—*Only then I do use chloroform;* that is what I said; I use anæsthetics for convenience sake.

3601. But practically, has not the howling of the dogs interfered with experiments?—Dogs do howl also when you chloroform them.

3602. Do you try experiments with any animals that do not signify pain so loudly?—Rabbits.

3603. They do not howl, I suppose?—They do not.

3604. Then of course the same motive would not induce you to use chloroform in their case?—No.

3605. In fact, I suppose with rabbits you would not use chloroform?—I use chloral hydrate; but as a general rule, for my scientific investigations, *I do not use chloroform, or any other anæsthetic, except for convenience sake,* in dogs and cats, and for no other animals as a general rule. There may be exceptions, perhaps, but as a general rule, I think I am safe in saying I do not use it.

3606. You gave it as your opinion that your views on the subject, although not shared by the British public generally, were the views of the British physiologists.—I would not say that distinctly, but I know a few of them, and I think that is the view held by them.

3631. But now coming to vivisection proper, you do perform in this laboratory operations which involve a great deal of pain to the animal?—Yes, we do occasionally; of course they are very few.

3632. And without any question of employing anæsthetics, unless it happens to be for your own convenience to do so?—Yes.

3642. Why do you not chloroform a dog?—We chloroform a cat *because we are afraid of being scratched.*

3643. Why not a dog?—If it is a small dog *there is no fear of being bitten by the dog.*

3660. As I understand you, if you were directed to perform an

operation for the purpose of ascertaining some fact, or supposed fact, with reference to the nerves of a dog, and it became necessary to cut the back of the dog severely for the purpose of exposing the dog's nerves, for the sake of saving yourself inconvenience, *you would at once perform that without the use of anæsthetics?—Yes.*

3661. And it is only because the dog might howl, or get into contortions, that you would use anæsthetics at all?—Yes.

3681. In the case of frogs you never take out any part of the brain before you perform these experiments, do you?—No.

3682. That is a short process, is it not?—Yes.

3683. But you think it unnecessary, because you say that *a physiologist has a right to do as he likes with the animal?*—Yes.

3739. And you think that *the view of scientific men* on the Continent is your view, that *animal suffering is so entirely unimportant compared with scientific research that it should not be taken into account at all?*—Yes, except for convenience sake."

SHALL VIVISECTION BE PERMITTED IN SCHOOLS?—A DANGEROUS IDEAL.

[By Albert Leffingwell, M. D. Published by the American Humane Association.]

It seems almost incredible that at the middle of this nineteenth century there was no law in America which made the cruel treatment of animals, in itself, a punishable offense. Those of us old enough to remember village life, say 40 years ago, will recall many an act of inhumanity which then passed for "sport," but which to-day is a crime. I remember certain companions of my own boyhood, for example, all of them regular attendants at the same village Sunday school, telling me of "experiments" they had made in torturing kittens and rabbits, simply to watch their convulsions in the agony of death. If a man saw fit to pour alcohol over his dog and set him afire, there was, indeed, protest against his brutality, but otherwise he was safe. The law of the land set no limits to his treatment of his own property. If he chose to burn it alive when its services were no longer of value, who had the right to object?

Have we changed all this? Certainly, to some extent. Cruelty, the needless infliction of pain, the torture for amusement, is at last recognized, not only as an offense against good manners, but as an injury to the Commonwealth. Humane societies and bands of mercy now inculcate lessons of kindness at the earliest age. Children are to-day taught that cruelty is wicked; that there is something of sacredness in every life, and that mercy is due even to the worm that crawls at our feet.

But is there to be seen any tendency backward at the present time? The infliction of slow torture upon helpless animals—is this again coming into general practice and to be defended by argument? Is it even about to be taught to young men and young women as a necessity of education? This seems to me one of the serious questions of the hour. Within the past thirty years a new ideal has become prominent—the longing to penetrate to the inmost heart of things, to solve every enigma of Nature, and to unravel each mystery of human existence. Whence comes the origin of life? Whither are we going? What is the cause of all these curious phenomena which we sum up in the word vitality? These are questions modern science proposes, and desires either to answer or prove unanswerable. Man once sought to know his duty to his God and his fellow-men; the advanced scientific spirit

of to-day sometimes asks us if, after all, we are quite certain we have any duties, or if we are sure that God exists?

What is the ideal of this phase of thought? It seems to me this: *that in future the chief aim of human endeavor should be to wrest from Nature her secrets.*

But supposing certain facts are so intimately wrapped up with life and sensation that we can get at them only by the infliction of acute agony, of prolonged pain? What if one who seeks to penetrate to the innermost sanctuary of life must unlearn every lesson of pity, must teach himself to take pleasure in the agony he inflicts, must become almost a human fiend? No matter. What is the sentiment of compassion that for a moment it should stand in the way of scientific investigation? A true physiologist, says Dr. Claude Bernard, "does not hear the animal's cries of pain. He is blind to the blood that flows. *He sees nothing but his idea*, and organisms which conceal from him *the secret he is resolved to discover.*" The question of benefit to one's fellow-creatures need not for a moment enter his thoughts. "I do not believe," says Dr. Charles Richet, professor of physiology in Paris, "that a single experimenter says to himself, when he gives curare to a rabbit or cuts the spinal cord of a dog, 'Here is an experiment which will relieve or cure disease.' No; he does not think of that. He says to himself, "I shall clear up an obscure point; I will seek out *a new fact.* And this scientific curiosity which alone animates him is explained by the idea he has of science. This is why we pass our days surrounded by groaning creatures, in the midst of blood and suffering, and bending over palpitating entrails."[1]

How far has this spirit of inquiry, no matter at what cost, penetrated American institutions of learning? Does it govern the teaching of our schools of medicine? In schools, academies, and colleges shall young men and young women, boys and girls, be taught that the new scientific ideal of investigation for its own sake *demands* a *personal confirmation of every physiological statement?* Are text-books to give way before the young student with his cords and knife? That is a present tendency, it must be confessed.

In the Popular Science Monthly Dr. Wesley Mills, professor of physiology in McGill University, has argued strongly in favor of teaching science by means of experiment. "Introduce scientific methods and introduce science itself according to the laws that underlie our organization, and you will revolutionize our schools," he tells the teachers to whom he was speaking. "Physiology is perhaps the most difficult of all sciences to teach well in schools. Book physiology is rubbish, utter rubbish," he exclaims with warmth. "*There is no science that does not permit of simple experiments* that may be introduced into any school. *The pupils will delight in these*, and they will prove a source of strength, pleasure, and inspiration. I am not to be understood as claiming that every fact that a child shall take cognizance of shall be gained through observation and experiment; *but this is the ideal, and the nearer it is approached the better.*" * * * "From first to last the student should be an investigator. This implies a great deal." It does indeed. Not long since I was given the name of a young girl whose scientific enthusiasm had been so keenly stirred that she gave up her pet kitten to the teacher of physiology that it might be vivisected before her class.

What is to be the outcome of this new and dangerous ideal? I do not see how it can result in anything else than *education in the art of*

[1] "Revue des Deux Mondes," Feb. 15, 1883.

scientific cruelty. By instinct nearly every lad born into the world is a savage; it is by training and education that he learns compassion and feels pity. Now suppose the young student is taught that to inflict pain—"to seek out a new fact," as Richet phrases it—is not merely excusable, but deserving of praise. Torture then finds an apology; the inarticulate agony of his pet dog or rabbit will no longer shock. Like De Cyon, of St. Petersburg, he will approach his vivisections with a "joyful excitement," perhaps all the more pleasurable because aroused by the agony he inflicts. Like Mantegazza, of Milan, he may crucify pregnant rabbits with "atrocious torture" (*dolores atrocissimi*), conducting his experiments as the Italian physiologist conducted his, "with much pleasure and patience." Like Klein, of London, he will learn to have "no regard at all" for the suffering he inflicts because in the progress of his investigations in torture he "has no time, so to speak, for thinking what the animal may feel or suffer."

Now, speaking as a physician, I can not but regard this development of the new scientific spirit in our public schools and academies with grave doubt and keen apprehension. There are peculiar dangers which invariably accompany investigations like these; for nothing is more certain than that there may arise in some organizations a strange satisfaction or sensation of content at the sight of agony or bloodshed, and in these cases a great danger, which can not be fully explained, is close at hand. "I would shrink with horror," said Dr. Haughton, "from accustoming classes of young men to the sight of animals under vivisection. * * * Science would gain nothing, and the world would have *let loose upon it a set of young devils.*" "Watch the students at a vivisection," suggested the late Dr. Henry J. Bigelow, professor of surgery at Harvard Medical School. "It is the blood and suffering—not the science—that rivets their breathless attention." Is it not a significant fact—which the last census of the United States reveals—that of the whole number of murderers confined in jails and prisons, one occupation contributed so many—the one which pertains to bloodletting and butchery? The State of Massachusetts once produced a boy murderer who took diabolic delight in cutting and stabbing children to death. In August, 1891, John Conway was hung at Liverpool for the inexplicable murder of a little boy. Immediately after the drop fell his confession was read: "I was impelled to that crime by a murderous mania—*a morbid curiosity to observe the process of dying.*"

A Canadian physician was executed in London in 1892 for murder. A number of young women, against whom he had no cause for malice, he had undoubtedly put to death by one of the most agonizing of poisons, and under guise of conferring a benefit, merely that in the contemplation of their suffering he might find pleasure and excitement. Cicero tells us that in his time men took their sons to gladiatorial combats in order that youth might learn how to die bravely when the summons came. Ah, if that had been the only lesson taught! A century of such lessons passes and then this sight of fierce combat and bloody struggle has stirred into life among the Roman populace a taste for human agony that the mere death of gladiators could not satisfy; and then came the infamous exhibitions related by Tacitus and Suetonius—the feasting of lions upon Christian martyrs, and living human torches, smeared with pitch, burning at night in the gardens of Nero. Over how much of her history, humanity is obliged to draw the veil! Dr. Rolleston, professor of anatomy at Oxford University, but hinted at the truth when he told the royal commission that "*the sight of a living, bleeding, and quivering organism most undoubtedly acts in a particular*

way on the nature within us"—that lower nature which we possess in common with the carnivora."

I have written this as a warning of which there seems to me a growing need. To the practice of vivisection in medical schools I do not now refer; that is a question by itself. But let me advise parents and teachers to be infinitely cautious before—even in the name of science—they incur the needless risk of awakening the demon of cruelty in the hearts of the young. No experimentation upon living animals which involves the causation of pain or the flow of blood should ever be shown to classes of students in schools. There are no compensating advantages to the positive dangers which the practice involves. There are no scientific truths necessary to be known which may not be fixed upon the memory of any pupil without this risk.

PUBLIC OPINION CONCERNING VIVISECTION.

[Extracts from Report on Vivisection by American Humane Association.]

In 1895 the American Humane Association attempted to ascertain whether public sentiment among the educated classes, of this country especially, was favorable to the practice of vivisection without limitations or to some measure of legal supervision or restriction. To accomplish its end it was deemed necessary to formulate precise statements of slightly diverging beliefs in such form as that they should at any rate touch this one question of restriction or nonrestriction of experiments in pain. It needs to be remembered that the word "vivisection," when used as a synonym for scientific experiments upon animals, may cover operations not more painful than a pin prick; or, on the other hand, experiences as excruciating as the imagination can conceive. To ask simply whether one approves of vivisection or condemns it would be meaningless, unless the definitions given were precise.

Three leading views regarding the practice of vivisection may be easily recognized:

1. Its approval without other restraint than the will of the experimenter.
2. Its legal restriction, either to useful experiments or to painless research.
3. Its total condemnation, because of tendency to cruelty and abuse.

It is, of course, impossible to print the entire report, but the leading points of each of four statements are given, accompanied by some of the signatures of those in agreement therewith. Over two thousand expressions of opinion were obtained—considerably more than half being from physicians who had been in practice over fifteen years. Of this class of medical practitioners who favored the American Humane Association with their views, 19 per cent were in favor of vivisection without limitations, 45 per cent were for vivisection when restricted by utility, 16 per cent for vivisection only when painless, and 18 per cent for its total prohibition, 2 per cent being evasive or obscure.

I. VIVISECTION WITHOUT RESTRICTIONS.

"Vivisection, or experimentation upon living animals, must be looked at simply as a method of studying the phenomena of life, and as such it should be subject neither to criticism, supervision, nor restraints of any kind.

"It may be used by any scientific experimenter to any extent he may *desire for demonstration* before students of the statements contained

in their text-books, as an aid to memory, or for any conceivable purpose of investigation into vital phenomena. And while many discoveries of value in the treatment of human ailments have undoubtedly been due to experiments on animals, yet even these we regard as of secondary importance to the absolute freedom of research, and the independence of science from all restrictions and restraints. Pure science, which exists for its own sake, stands on a far higher plane than science which exists merely for utility to mankind. We firmly believe that vivisection should be used, and will always be mostly used, *to add to pure scientific knowledge as such, without reference to any usefulness foreseen.* Truth should be sought for its own sake. Dr. Hermann, professor of physiology at Zurich, has well said that "no true investigator in his researches thinks of their practical utilization; that the advancement of knowledge, and not practical utility to medicine, is the true and straightforward object of all vivisection."

We would not avoid the question of pain. It is often the necessity of vivisection. But nature will not yield all her secrets without a wrench. For instance, if only by causing acute suffering a teacher can illustrate the functions of the nervous system, should he merely for that reason stay his hand? Ought we to insist that an enthusiastic experimenter *should forego any phase of research whatever* simply because of the torture that research may perhaps require? Such questions afford but one reply. Science does not place reverence for pity higher than its reverence for any new fact whatever.

In our judgment *this question of pain should be left absolutely to the decision of the experimenter himself.* He alone can determine what degree of pain he needs to inflict for the success of his experiment. No laws should constrain him, no critics judge him."

One hundred and sixty four physicians subscribed to this view of vivisection. As Dr. Mary Putnam-Jacobi appeared before the Senate committee in opposition to the bill for the regulation of vivisection in the District of Columbia, the expression of her views is given in full:

Mary Putnam-Jacobi, M. D., visiting physician at the New York Infirmary, graduate from L'École de Médicine, Paris, France, 1871:

"This statement entirely represents my views on this important question, yet leaves something to be added. It is, in my opinion, ridiculous for outsiders, necessarily imperfectly acquainted with methods of physiological research, to be allowed to prescribe what may or may not be done to demonstrate a proposition or to impart to students a living conception of the phenomena of life. But I think it quite fair that the experimenter should—like the butcher, and more than is at present the case with the hunter—be to a certain extent supervised and expected to reduce to a minimum the suffering inflicted, and to inflict none but what is absolutely necessary to attain his chosen end."

II. VIVISECTION RESTRICTED BY UTILITY.

"Vivisection is a practice of such variety and complexity that, like warfare between nations, one can neither condemn it nor approve it unless some careful distinctions be first laid down. We hold that only a great and definite advantage to the interests of humanity can justify its use, and that in each case science must prove that advantage and that necessity; its hands should not be left free to inflict torture without restriction or restraint. Even the zeal of a Magendie or a Mantegazza can not condone their cruelty, nor can science make the search for a fact obliterate the distinctions between right and

wrong. Within certain limitations we regard vivisection to be so justified by utility as to be legitimate, expedient, and right. Beyond these boundaries it is cruel, monstrous, and wrong.

Experimentation upon living animals we consider justifiable when employed to determine the action of new remedies; for tests of suspected poisons; for the study of new methods of surgical procedure, or in the search for the causation of disease—in short, for any object where the probable benefit to mankind is very great, and the suffering inflicted not greater than that of instantaneous death, nor more than the pain and distress of the human ailments to alleviate which the experiment is made. On the other hand, we regard as cruel and wrong the infliction of torment upon animals in the search for physiological facts which have no conceivable relation to the treatment of human diseases; or experiments that seem to be made only for the purpose of gratifying a heartless curiosity.

We consider as *wholly unjustifiable* the common practice in the United States of subjecting animals to torture in the laboratory or class room, merely for the purpose of demonstrating well-known and accepted facts. We hold that the infliction of torment upon a living animal under such circumstances is not justified by necessity, nor is it a fitting exhibition for the contemplation of youth.

We believe, therefore, that the common interests of humanity and science demand that vivisection, like the study of human anatomy in the dissecting room, should be brought under the direct supervision and control of the State. The practice, whether in public or in private, should be restricted by law to certain definite objects, and surrounded by every possible safeguard against license or abuse."

This statement received by far the greater number of signatures. Among those signing it were:

Herbert Spencer, author, London.

Sir Edwin Arnold, author, and editor of the London Telegraph, London:

"It is with this that I agree, detesting and dreading unlicensed vivisection. But I love and honor science too much to deny her any right, exercised with true scientific spirit; that is, with reverence, mercy, and love to all living things. I would hardly allow even an angel to vivisect without anæsthetics."

The previous statement Sir Edwin Arnold characterizes as "the language of scientific devils."

Robert Braithwaite, M. D., F. L. S., London:

"* * * After facts have been sufficiently established, it is not necessary to repeat experiments for individual satisfaction, still less for demonstration to students; the facts should be accepted from the teacher equally with other facts which can not be demonstrated."

President David H. Cochran, Ph.D., LL.D., Polytechnic Institute, Brooklyn, N. Y.

President Martin Kellogg, LL.D., University of California, Berkeley, Cal.

President Henry Wade Rogers, LL.D., Northwestern University, Evanston, Ill.

President Elmer H. Capen, D.D., Tufts College, Massachusetts.

President Charles Kendall Adams, LL.D., University of Wisconsin, Madison, Wis.

R. H. Thurston, LL.D., director of Sibley College, Cornell University, Ithaca, N. Y.

C. C. Everett, D.D., dean of Harvard Divinity School, Cambridge, *Mass.*

George Hodges, D. D., dean of Episcopal Theological School, Cambridge, Mass.

James O. Murray, dean of Princeton University, Princeton, N. J.

Cyrus Northrop, LL. D., president University of Minnesota, Minneapolis, Minn.:

"Vivisection is practiced more than is necessary; it ought undoubtedly to be restrained. Doubtless it has its uses in teaching, but its value in investigation has been overrated."

Prof. William James, M. D., author; professor of psychology, Harvard University, Cambridge, Mass.:

"If public opinion could constitute the check, I should prefer that; but that would necessarily be ineffectual. I think there will be great difficulty in defining by law what is legitimate, or in having whatever law were made discriminatingly administered. In principle, however, I have not a moment's hesitation in standing up for the vivisector being outwardly responsible for his acts."

Right Rev. Henry A. Neely, bishop of Maine:

"The above statement most nearly expresses my views. If the opinions of Sir Charles Bell, Dr. Lawson Tait, and Dr. Bell-Taylor (quoted in the first statement) were generally indorsed by pathologists of the highest class, it would follow, *me judice*, that vivisection can in no case be justified."

Right Rev. Joseph Blount Cheshire, jr., bishop of South Carolina:

"While as a matter of sentiment I am strongly inclined to say that vivisection should be absolutely prohibited, yet I am not able to justify that position fully to my mind and conscience. The statement of 'vivisection restricted by utility' seems to me to be in accordance with relations which God has established and declared between man and the lower orders of living creatures. Vivisection should be allowed only in case of necessity or of great utility, and then under strict regulations."

Right Rev. Mahlon N. Gilbert, assistant bishop of Minnesota.

Right Rev. Charles Todd Quintard, D. D., bishop of Tennessee.

Right Rev. Anson R. Graves, LL. D., bishop of the Platte.

Right Rev. Alexander Burgess, bishop of Quincy.

Right Rev. Cortlandt Whitehead, bishop of Pittsburg.

Right Rev. George W. Peterkin, LL. D., bishop of West Virginia.

Right Rev. F. D. Huntington, bishop of central New York.

Right Rev. Lemuel H. Wells, bishop of Spokane.

Right Rev. Nelson Somervile Rulison, assistant bishop of central Pennsylvania.

Prof. T. M. Balliet, M. D., professor of therapeutics, Dartmouth Medical College, Philadelphia, Pa.

Prof. T. Gaillard Thomas, M. D., College of Physicians and Surgeons, consulting surgeon of the State Women's Hospital, New York.

Simon Baruch, M. D., physician to the Manhattan General Hospital, New York, and late physician and surgeon to the New York Juvenile Asylum. (Would permit vivisection for demonstration, under anæsthesia.)

Prof. George Montgomery Tuttle, M. D., professor of gynæcology in the College of Physicians and Surgeons, New York.

Prof. Andrew H. Smith, M. D., post-graduate school, attending physician of the Presbyterian Hospital, New York.

Prof. Alonzo Boothby, M. D., associate professor of surgery, Boston, School of Medicine:

"It does not seem clear upon what grounds you are making the inquiry; but as the matter is a very important one, and as there has

been such an unnecessary and absurd use of animals to amuse students and idlers, I send you my protest, with the hope that your object is to lessen the evil."

Daniel Cook, M. D., New York City:

"In my experience, certain vivisections are performed mostly for the most unworthy object of making the lectures sensational above those at other colleges—exactly as our theaters and newspapers vie with one another in furnishing blood-curdling plays or sensational news."

John Allan Wyeth, M. D., president of the faculty of the New York Polyclinic Medical School and Hospital, New York.

Albert McScully, M. D., M. Ch., L. M., Queen's University, formerly assistant demonstrator of anatomy in Queen's College, Ireland, New York City:

"A person actively engaged in vivisection is inclined to subscribe to the fourth statement. The whole mind is absorbed in the subject, and clear, unbiased reasoning is then out of the question. I felt thus myself at one time, when full of my subject, as well as full of youthful ardor. After mature deliberation, I freely and unconditionally subscribe to this statement."

G. B. Hope, M. D., New York City:

"From what I have been witness to in several steps of my student career, I am heartily in sympathy with your investigation. I believe in the severest control governing vivisection. Every class-room exhibition particularly should be prohibited as useless and demoralizing. I would have every experimenter file an application, giving the nature and intention of the operation, and subsequently report the number, size, and quality of animals employed, with the results obtained. Such a course would check needless and vicious operations."

(Dr. Hope graduated twenty years ago from a medical college notorious for its extreme vivisections.)

Archibald T. Banning, M. D., president City Medical Association, Mount Vernon, N. Y.:

"I well remember when a student the feelings of horror that arose on seeing certain experiments. * * * The first experiment was altogether an outrage; the second, though of some utility, had already been sufficiently demonstrated, and a mere statement from the professor would have accomplished as much instruction as ocular evidence. The impression thus made on the unformed minds of students is bad, and might have a tendency to develop some morbid psychopathic action such as 'Sadism.' I have such cases in view."

John L. Schoolcraft, M. D., Schenectady, N. Y.:

"The continual practice of vivisection by assistant lecturers and others to show what has been thoroughly proven by men of reputation should be absolutely prohibited."

William J. Burr, M. D., late acting staff surgeon, United States Army, Newark Valley, N. Y.:

"I have seen most kindly conducted experiments, and also others most abhorrent. In my opinion vivisection should be under restrictions and conducted without pain."

S. P. Moore, M. D., Munnville, N. Y.:

"I am aware that we are apt to forget what is right in efforts after fame. As I grow older certain scenes before a class of young men seem to me of very doubtful propriety. Medical students are apt to be rough enough without such sights."

Jonathan Kneeland, M. D., South Onondaga, N. Y.:

"If we know less of the mysteries of existence by refraining from

tormenting our pets, we shall at any rate increase the total joy of animal life."

William H. Munn, M. D., New York City:

"No undergraduate to attempt it; only by a professor, and with the least pain."

John Parmenter, M. D., professor of anatomy and clinical surgery, University of Buffalo, surgeon to the Erie County Fitch and Children's Hospitals, Buffalo, N. Y.

Archibald M. Campbell, M. D., consulting physician in the Home for Incurables, New York City, member of the Academy of Medicine, physician to the New York Infant Asylum, etc., Mount Vernon, N. Y.

Herman Mynter, M. D., professor of surgery, Niagara University, Buffalo, N. Y.

James E. Kelly, M. D., F. R. C. S., consulting surgeon, French Hospital, New York City.

O. B. Douglass, M. D., surgeon to the Manhattan Eye and Ear Hospital, late president of the Medical Society of the county of New York, etc.

Charles S. Mack, M. D., professor of materia medica and therapeutics, University of Michigan, Ann Arbor, Mich.:

" * * * Regard as useless much that some regard as useful."

George M. Gould, M. D., editor of the Medical News, Philadelphia, Pa.:

" Whenever possible, under anæsthesia."

Isaac Sharpless, LL. D., president of Haverford College, Pennsylvania.

A. H. Fetterolf, Ph. D., LL. D., president of Girard College, Philadelphia, Pa.

W. F. McDowell, D. D., chancellor of the University of Denver, Colo.

William M. Blackburn, D.D., LL. D., president of Pierre University, Pierre, S. Dak.

W. H. Scott, LL. D., president of the Ohio State University, Columbus, Ohio.

Francis Wayland, LL. D., Dean of Yale Law School, New Haven, Conn.

Francis F. Browne, editor of The Dial, Chicago, Ill.:

"Believing that all the relations of men to animals, like the relations of men to each other, should be subject to State regulation, I of course hold that vivisection should be under such control, and very stringently."

Prof. William A. Packard, Princeton University, New Jersey.

Prof. George M. Harper, Ph. D., Princeton University, New Jersey.

Prof. Benj. Ide Wheeler, Cornell University, Ithaca, N. Y.

Prof. Edward Hitchcock, jr., Cornell University, Ithaca, N. Y.

Prof. Charles E. Bennett, Cornell University, Ithaca, N. Y.

Prof. George P. Bristol, Cornell University, Ithaca, N. Y.: "In hearty sympathy with this statement."

Prof. Robert Baird, Northwestern University, Illinois.

Prof. Charles F. Bradley, D. D., Garrett Biblical Institution, Evanston, Ill.

Prof. John M. Shaller, M. D., professor of physiology, College of Medicine and Surgery, Cincinnati, Ohio.

Prof. C. F. Brackett, M. D., LL. D., president of the board of health for the State of New Jersey, professor of physics, Princeton, N. J.

Prof. William Francis Magie, Ph. D. (Berlin), professor of physics, Princeton College, New Jersey.

Prof. Francis H. Herrick, biologist, Adelbert College, Cleveland, Ohio.

Prof. Ogden N. Rood, professor of physics, Columbia College, New York.

Prof. Charles B. Atwell, Ph. M., professor of botany, N. W. University, Evanston, Ill.

Prof. A. E. Turner, A. M., professor natural sciences, Lincoln University, Illinois.

Prof. Henry B. Cornwall, professor of chemistry, Princeton, University, New Jersey.

Prof. Henry L. Obetz, M. D., professor of surgery, University of Michigan, Ann Arbor.

Prof. Frederick Tracy, Ph. D., lecturer in psychology, University of Toronto, Canada.

Prof. John C. Branner, Ph. D., professor of geology, Stanford University, California.

Prof. Albert Nott, M. D., professor of physiology and dean of Tufts College Medical School, Massachusetts.

Prof. Albert E. Miller, M. D., professor of physiology, College of Physicians and Surgeons, Boston, Mass.

Prof. A. A. D'Ancona, M. D., professor of physiology, University of California, San Francisco, Cal.

President Alvah Hovey, D. D., LL. D., president of the Newton Theological Institute, Newton, Mass.

Prof. Arthur S. Hoyt, A. M., D. D., Auburn Theological Seminary, Auburn, N. Y.

Prof. George R. Freeman, A. M., D. B., Meadville Theological School, Pennsylvania.

Prof. Wooster W. Beman, A. M., University of Michigan, Ann Arbor, Mich.

Prof. Benjamin S. Torrey, University of Chicago, Ill.

Prof. W. H. Mace, A. M., Syracuse University, New York.

Prof. Franklin J. Holzwarth, Ph. D., Syracuse University, New York.

Prof. Eugene Haanel, Ph. D., professor of physics, Syracuse University, New York.

Prof. John R. French, vice-chancellor, Syracuse University, New York.

Prof. A. T. Murray, Stanford University, California.

Prof. Leveritt W. Spring, Williams College, Massachusetts.

Prof. L. D. Woodbridge, M. D., Williams College, Massachusetts.

Prof. Anson D. Morse, M. A., Amherst College, Massachusetts.

Prof. Clifford H. Moore, University of Chicago, Illinois.

Prof. John B. Clark, Amherst College, Massachusetts.

Prof. J. B. Parkinson, University of Wisconsin, Madison, Wis.

Prof. Walter D. Toy, University of North Carolina.

Prof. E. W. Hyde, University of Cincinnati, Ohio.

Prof. Charles E. Fay, A. M., Tufts College, Massachusetts.

Prof. Edward A. Allen, Lit. Dr., University of Missouri, Columbia.

Prof. Isaac N. Demmon, University of Michigan, Ann Arbor.

Prof. Charles Davidson, Ph. D., Adelbert College, Cleveland, Ohio.

Prof. G. T. Knight, Tufts College, Massachusetts.

Prof. Cornelius B. Bradley, A. M., University of California.

Prof. Arthur T. Hadley, Yale University, New Haven.

Prof. Frederic D. Allen, Ph. D., Harvard University, Cambridge.
Prof. Eugene L. Richards, Yale University, New Haven.
Prof. C. G. Rockwood, jr., Princeton University, New Jersey.
Francis A. Schlitz, M. D., Brooklyn, N. Y.
D. H. Goodwillie, M. D., New York.
Thos. Gilfillan, M. D., Northampton, Mass.
Prof. James H. Robinson, Ph. D., Columbia College, New York.
Prof. J. Macy, A. M., Iowa College, Grinnell, Iowa.
Allen M. Thomas, M. D., president of the New York Clinical Society, New York City.
J. Oscoe Chase, M. D., assistant surgeon of the New York Ophthalmic Hospital, etc., New York City.
John L. Hildreth, M. D., Cambridge, Mass.
Prof. J. S. Prout, M. D., Long Island College Hospital, Brooklyn, N. Y.
Sir Joseph Fayrer, M. D., K. C. S. I., surgeon-general, London.

(Sir J. Fayrer strikes out several words and clauses, particularly the references to Magendie and Mantagazza. He leaves, however, the following sentences intact:)

"We regard as cruel and wrong the infliction of torment upon animals in the search for physiological facts which have no conceivable relation to the treatment of human diseases. * * * We consider as wholly unjustifiable the practice of subjecting animals to torture in the laboratory or class room merely for the purpose of demonstrating well-known and accepted facts. * * * Such experiments as these are degrading in tendency."

(Reference is often made to Sir J. Fayrer's numerous experiments in India on snake poison; and his indorsement of the foregoing paragraphs is the more striking as coming from one of the leading experimenters.)

Rev. John J. McCook, Trinity College, Hartford, Conn.

"There are not probably many men who would conduct experiments involving pain or loss of life without using an anæsthetic, unless there were some real and convincing necessity; and yet I have witnessed some. I fear it is a fact that vivisection inevitably tends to make the conscience of the operator a trifle too easy in regard to the whole matter. Restraint ought to be carefully limited, however."

Albert Leffingwell, M. D., New York.

III. VIVISECTION ALLOWABLE IF WITHOUT PAIN.

"Whether that experimentation upon living animals known as vivisection is justifiable or not depends, in our judgment, *exclusively on the question of pain.* * * * The use of chloroform and ether have made it possible to perform certain experiments and demonstrations upon living animals without the slightest pain, and these only we regard as justifiable for demonstration or research.

"The dangers of this practice, however, are so many, the temptations to excess are so strong, the abuses to which it has led are so notorious and deplorable, that the decision of this question of pain should not be left to the judgment of each experimenter; but the whole practice, like the study of human anatomy with dissection, should be regulated by definite laws, confined to certain objects, permitted only to competent and trustworthy persons, and restricted to licensed places, which shall be open at all times to inspection by the presidents of humane societies for protection of animals, or their authorized representatives."

To this statement of opinion 398 signatures were affixed, of which 197 were those of physicians. Among these were:

Albert L. Gihon, A. M., M. D., medical director United States Navy, in charge of the United States Naval Hospital, Washington, D. C.

Prof. Henry M. Field, M. D., emeritus professor of therapeutics, Dartmouth Medical College:

"I give the above my emphatic approval. But if vivisection thus restricted and guarded is not attainable, I should affix my signature to the last.

Clinton Wagner, M. D., senior surgeon of the Metropolitan Throat Hospital, New York City:

"Vivisection may be allowable if without pain and performed by the professor or his licensed assistants, and only in the laboratories of incorporated *medical* schools."

W. C. Bouton, A. B., M. D., clinical instructor in neurology at the Northwestern University Medical School, Chicago, Ill.:

"I do not believe that vivisection should be wholly dispensed with, for I believe that we can still gain some valuable knowledge from it. But I believe, as stated, that it should be without pain, regulated by definite laws, confined to certain objects, permitted only to competent and trustworthy persons, and restricted to licensed places, which shall be open at all times to inspection by the presidents, or their authorized representatives, of humane societies for protection of animals."

Prof. H. B. Cummins, M. D., professor of physiology, Lincoln, Nebr.

Prof. Franklin Townsend, A. M., M. D., professor of physiology, Albany Medical College, Albany, N. Y.

Prof. J. C. Hartzell, jr., M. S., professor of biology, Claflin University, Orangeburg, S. C.

Prof. J. H. Etheridge, A. M., M. D., professor of obstetrics and gynæcology, Rush Medical College, Chicago, Ill.

Prof. H. D. Champlin, M. D., professor of nervous diseases, Cleveland University of Medicine and Surgery, Cleveland, Ohio:

"I do not believe in these cases any tyro should be allowed to vivisect; nor do I believe in vivisection just to verify old experiments. Unless something of great value is to be gained in a scientific way, it should be forbidden, even under the influence of an anæsthetic."

Prof. W. T. Wenzell, M. D., Ph. D., professor of chemistry, etc., University of California, San Francisco, Cal.

President E. Benjamin Andrews, D. D., LL. D., Brown University, Providence, R. I.:

"I would add that, if there are results of very great importance obtainable by vivisection without anæsthesia or with limited anæsthesia, I would permit vivisection without or with limited anæsthesia subject to the conditions recited above in the last paragraph of printed matter."

President Andrew V. Raymond, LL. D., Union College, Schenectady, N. Y.

President James R. Day, D. D., S. T. D., chancellor of the Syracuse University, Syracuse, N. Y.

President George A. Gates, D. D., Iowa College, Grinnell, Iowa:

"This, on the whole, seems nearest my own view. There are, perhaps, some cases where pain may be an essential factor of the investigation. This ought to be of the shortest possible duration consistently with the scientific purpose. More depends at last upon the right kind of heart in the bosom of the operator."

Rev. Frederic R. Marvin, M. D., Troy, N. Y.:

"I believe vivisection should be allowable in cases where pain may

be avoided, and then only as conducted by experts for some definite end of sufficient consequence. It should never be allowed for mere purposes of demonstration, or as a method of instruction in the class room or in the medical college."

(In another letter to the association, Dr. Marvin says: "Though now a minister of the Gospel, I was educated to the profession of medicine and was graduated from the College of Physicians and Surgeons, 'Medical Department of Columbia College, N. Y.,' in 1870. In the class room I saw vivisections so unqualifiedly cruel that even now they remain in my memory as a nightmare. I am persuaded that none of the so-called experiments upon living animals that I witnessed were of any real value to me or to my fellow-students.")

A. N. Brockway, A. M., M. D., New York City:

"*My opinion is that no experimenter should inflict pain on any animal which he would not himself be willing to suffer in the same cause.*"

William Wallace Gardner, M. D., Springfield, Mass.:

"I believe it useful under proper restrictions to save human suffering. *What I should be willing to suffer voluntarily, the lower order of animals should be obliged to suffer for humanity's sake.*"

Albert H. Blanchard, M. D. (Harvard), Sherborn, Mass.:

"It appears to me that the advantages of vivisection, and the practical good derived therefrom, are not, at present at least, sufficient to justify its practice unless it can be done without pain."

C. J. Cleborne, M. D., medical director, United States Navy, Naval Hospital, Norfolk, Va.

Prof. J. Henry Jackson, A. M., M. D., professor of physiology, Barre, Vt.

Frank W. Ring, M. D., A. M., surgeon to Manhattan Eye and Ear Hospital, New York City.

N. A. Mossman, M. D., New York City:

"Without supervision, indifferent experimenters might say that they had complied with all the requirements if they gave a few inhalations of chloroform, then experimented any length of time without continuing its use."

Mr. William Dean Howells, author, New York City.

Mr. Edward Bellamy, anthor, Chicopee Falls, Mass.

Mr. Brander Matthews, anthor, New York City.

Prof. Albert Bushnell Hart, Harvard College, Cambridge, Mass.

Prof. John Bascom, Williamstown, Mass.

Prof. Albion W. Small, Ph. D., professor of sociology, University of Chicago.

Prof. John Grier Hibben, professor of logic, Princeton University, Princeton, N. J.

Prof. Charles W. Shields, Princeton, N. J.:

"Vivisection is allowable if without pain, in the judgment of humane and scientific experts."

Prof. W. F. Hewett, Cornell University, Ithaca, N. Y.

Prof. Galusha Anderson, D. D., LL. D., professor of practical theology, University of Chicago.

Prof. H. S. White, dean of Cornell University, Ithaca, N. Y.:

"Vivisection is allowable if for true scientific purposes, in order ultimately to ameliorate the condition of mankind, as well as of animal life in general."

Prof. S. Burnham, dean of the Hamilton Theological Seminary, Hamilton, Madison County, N. Y.

Prof. Henry K. Edson, Grinnell, Iowa.

Prof. W. G. Tousey, A. M., B. D., Tufts College, Mass.
Prof. M. L. D'Ooge, University of Michigan, Ann Arbor, Mich.
Rt. Rev. Thomas A. Jagger, bishop of Southern Ohio.
Rt. Rev. George F. Seymour, bishop of Springfield, Ill.
Rt. Rev. Daniel S. Tuttle, bishop of Missouri, St. Louis, Mo.
Rt. Rev. C. K. Nelson, bishop of Georgia, Atlanta, Ga.
Rt. Rev. O. W. Whitaker, bishop of Pennsylvania.
Rt. Rev. Francis K. Brooks, bishop of Oklahoma and Indian Territories, Guthrie, Okla.

IV. TOTAL PROHIBITION OF VIVISECTION.

"Whether any useful knowledge can thus be acquired or not is beside the question. Even if utility could be proved, man has no moral right to attempt to benefit himself at the cost of injury, pain, or disease to the lower animals. *The injury which the practice of vivisection causes to the moral sense of the individual and to humanity far outweighs any possible benefit that could be derived from it.* Dr. Henry J. Bigelow, professor in the Medical School of Harvard University, declared that '*vivisection deadens the humanity of the students.*' Nothing which thus lowers morality can be a necessity to progress. * * * Painless or painful, useless or useful, however severe or however slight, vivisection is therefore a practice so linked with cruelty and so pernicious in tendency that any reform is impossible, and it should be absolutely prohibited by law for any purpose."

Prof. James E. Garretson, M. D., senior professor of surgery, Medico-Chirurgical College, Philadelphia:

"I am without words to express my horror of vivisection, though I have been a teacher of anatomy and surgery for thirty years. It serves no purpose that is not better served after other manners."

Forbes Winslow, D. C. L. Oxon., M. R. C. P., London, physician to the British Hospital for Mental Diseases, physician to North London Hospital for Consumption, etc.:

"In my opinion, vivisection has opened up no new views for the treatment and cure of diseases. It is most unjustifiable and cruel, and in no way advances medical science. I do not believe in many of the so-called experiments made by these 'faddists,' especially those relating to brain operations on monkeys and the consequent theory of cerebral localization. I have probably more experience than many of these experimenters who have given their opinions to the world as based on what they have done, and I beg leave to express my utter disbelief in the usefulness of such experiments and to discredit their being followed by any good results to mankind or to science in general."

Prof. William J. Morton, M. D., professor of nervous and mental diseases at the New York Post-Graduate Medical School and Hospital, New York City:

"I only wish I could state the above sentiments stronger. If mankind suffers from disease it is its own fault, to be cured by rectification of the causes which lead to it; and it is subversive of the high and moral order of the progress of humanity to inflict pain or death upon other living animals to abolish or minimize disease or suffering due to mankind's own fault."

(To Dr. Morton's father, Dr. W. T. G. Morton, the world owes one of the greatest blessings of this or any other age—the comparative conquest of pain by the inhalation of ether.)

B. F. Sherman, M. D., ex-president of the New York State Medical Society, Ogdensburg, N. Y.:

"If it could be restricted to utility and without pain, it would be all right; but if permitted at all, it will be abused."

Edwin A. W. Harlow, A. M., M. D. (Harvard), Wollaston, Mass.:

"The late Dr. Henry J. Bigelow, in a lecture which I heard before the Havard College Medical School, condemned the practice of some of the students in Paris in their vivisections on horses, without anæsthetics, as '*infernal inhumanity.*' Vivisections in all medical schools should be abolished."

E. H. Hawks, M. D., Lynn, Mass.:

"I believe that vivisection blunts the moral sense to such a degree as to become a strong force in the production of criminals."

J. D. Buck, M. D., professor of nervous diseases and the principles of therapeutics, and dean of Pulte Medical College, Cincinnati, Ohio.

Elmore Palmer, M. D., president (1890) of the Western New York Medical Society, Buffalo, N. Y.

William Ingalls, M. D., Boston, Mass.:

"*Absolute prohibition;* for unless a law can be made which no one can get away from, vivisection will obtain just as it does now."

Ira Clark Guptill, M. D., M. S., Northboro, Mass.:

"No legal restriction would be conscientiously observed, and therefore I strike for absolute prohibition by law."

Alex. S. McClean, M. D., Springfield, Mass.:

"Have been in practice forty-eight years, and have never been influenced or governed by anything I have seen or read in the line of vivisection."

Lorenzo W. Cole, M. D., Springfield, Mass.:

"I consider it barbarous to torture anything capable of feeling pain to demonstrate facts which have been proven thousands of times."

Ira D. Brown, M. D., Weedsport, N. Y.:

"Every word in the above statement I know to be true. The practice of vivisection is inhuman, cruel, and brutalizing in its effects upon those who witness it, while no information useful to the human family is gained from it. In our medical colleges it is indulged in as a sport, a pastime, to the moral degradation of the students, making them unfit for the practice of the healing art."

Right Rev. John Scarborough, D. D., bishop of New Jersey.

Right Rev. John Williams, D. D., LL. D., bishop of Connecticut.

Right Rev. Hugh Miller Thompson, D. D., bishop of Mississippi.

Right Rev. J. H. D. Wingfield, D. D., bishop of North California.

The Very Rev. E. A. Hoffman, D. D., D. C. L., dean of the General Theological Seminary, New York.

President W. P. Johnson, Geneva College, Pennsylvania:

"My opposition to vivisection is not so much because of the pain to the animal dissected (it dies in a little while), but because of injury to the moral nature of the animal dissecting, that lives probably for many years, and has *other* chances on other animals than dogs and cats!"

William H. Payne, LL. D., chancellor of the University of Nashville, Tennessee.

Prof. Hiram Corson, LL. D., professor of English literature, Cornell University, Ithaca, N. Y.

Prof. Charles Mellen Tyler, A. M., D. D., professor of Christian ethics, Cornell University, Ithaca, N. Y.

Prof. W. S. Tyler, D. D., LL. D., professor of Greek, Amherst College, Massachusetts.

Prof. Harry T. Peck, A. M., Ph. D., professor of Latin language and literature, Columbia College, New York.

Prof. G. C. Wheeler, B. S., Ph. D., chair of chemistry, Cornell University, Ithaca, N. Y.

Prof. S. G. Williams, A. B., Ph. D., professor of the art of teaching, Cornell University, Ithaca, N. Y.

Rev. Dr. Amory H. Bradford, associate editor of The Outlook, New York:

"I incline to a middle ground, but prefer to sign this."

President Henry Morton, Ph. D., Stevens Institute of Technology, Hoboken, N. J.

Senator GALLINGER. The hearing is now closed, and I will venture to express the hope that it has been conducted in a way satisfactory to both sides. At the proper time the bill will be presented to the Committee on the District of Columbia for consideration. I wish every member of the committee had been able to be here to-day, but they have been engaged elsewhere. Personally, I will say that I am much gratified to have met you all.

Dr. KEEN. I desire to say, Mr. Chairman, on behalf of those who are opposed to the bill, that your conduct of the hearing has been most satisfactory and that you have been most fair and that we are entirely content to rest our case.

The subcommittee adjourned.

APPENDIX.

The committee has received the following letter from Dr. Robert T. Morris, of New York, in opposition to the bill:

ANTIVIVISECTION.

[Letter from Dr. Robert T. Morris, professor of surgery in the New York Post-Graduate Surgical School.]

58 WEST FIFTY-SIXTH STREET,
New York, December 27, 1899.

MY DEAR SIR: The president of the American Medical Association has published an announcement to the effect that Senator Gallinger has again introduced into Congress the bill, "For the further prevention of cruelty to animals in the District of Columbia," present Senate bill No. 34. I assume that members of your honorable committee are already aware of the specious nature of the drawing of the bill, and that they understand its real objects—first, to prohibit vivisection, and secondly, to aid the passage of similar bills in all State legislatures. I assume further that the committee will wish to be guided by brief statements of fact rather than by other sorts of argument, and to that end I have requested some of the members of the medical profession to send to you an account of the advances in medical science that have been made by them personally through the aid of animal experimentation. Herewith is appended a concise account of that part of my own work which has been recorded in the literature of the profession.

1. Peritonitis usually leaves in its train adhesions of the abdominal organs which cause lifelong discomfort and invalidism for the patient. Such adhesions commonly cause also the death of the patient. Surgeons have sought in many ways to find relief for their patients with peritoneal adhesions, and with varying degrees of success—generally with failure. I experimented with rabbits and developed a plan of procedure, known as "the aristol film method," that has been accepted as successful by surgeons in different parts of the world. To have experimented in this way upon human beings would have been heartless and unsatisfactory, because it was necessary to correct several errors in theory, and this I was enabled to do readily by chloroforming and examining the rabbits at such steps in the experiment as seemed desirable. The outcome of my experimentation has been the direct means for avoiding unsatisfactory experimentation upon thousands of human beings, and it has been the direct means for saving life and preventing suffering on the part of such human beings.

2. Surgeons frequently have to operate upon appendicitis patients when infection has advanced to such a stage that it is necessary to apply a drainage device. The drainage device necessitates leaving a weak point in the structures of the abdominal wall. Hernia develops at such weak points. By experimenting upon dogs and rabbits I was enabled

to devise a plan of procedure which successfully obviates the danger of hernia. My plan of suturing the cæcum to the weak point in the abdominal wall in patients would not have received the support of surgeons, because it was believed that dangerous angulation of bowel would occur at such sutured points. My experiments with dogs and rabbits disproved the idea that angulation of bowel would occur, provided that the work was done in a certain way, and this has allowed surgeons to give their patients the benefit of a procedure which obviates much human misery. The method has been widely adopted.

3. A method for the removal of dead bone by the application of dilute mineral acids has been advocated from time to time by various surgeons, but, for an unknown reason, the treatment was not very successful. By experimenting upon the carapace of a living turtle I found a cause for the failures, and added a plan of procedure of which surgeons have been glad to avail themselves in the interest of their patients. Without such animal experimentation the cause of failure would probably have remained undiscovered.

4. After certain abdominal operations surgeons have commonly applied abdominal supporters that were a source of much discomfort for their patients. By experimenting upon rabbits I determined that such supporter could be discarded. The fact would have been discovered eventually in our work upon patients, but my experiment gave an early decision in the matter and patients who would have suffered discomfort are now relieved, as a result of facts brought out by the experiments.

5. Surgeons discovered that they were aided in a part of their work in the abdominal cavity by touching a part of the bowel with a salt which excited active movement of the muscular coat of the bowel. This indicated the direction of any given loop of bowel. By experimenting with rabbits for the simple purpose of confirming the widely published reports upon the desirability of this step in progress I discovered that it was accompanied by a grave danger known as the production of intussusception. By publishing the report upon my discovery surgeons were enabled to avoid subjecting their patients to the grave danger. Incidentally my experiment demonstrated the mechanism of intussusception. This had been the subject of much discussion in the medical profession; but my experiment can now be done as an object lesson in the presence of an audience.

6. Surgeons are experimenting upon patients to discover the best way for curing tuberculosis of the peritoneum. I experimented upon rabbits and developed information which is of much value in the understanding of the subject.

These experiments above noted have been directly of benefit in relieving human suffering. In addition, I have performed many other experiments that gave valuable negative testimony.

As a lover of animals and as a member of a humane profession, I have taken as much care to avoid suffering upon the part of the animals as I would be expected to take. My experiments, like those of vivisectors of my acquaintances, have had for their object the single purpose of benefiting humanity. My own work demonstrates only a trifling proportion of the advance that is annually made by surgeons in various parts of the world through animal experimentation. Unfortunately the men who are doing advance work in the interests of science and humanity usually have such contempt for the methods of the unin-

formed antivivisectionists that they will not even deign to make a statement of their side of the case, and legislative committees are apt to be influenced by the emotional, well-meaning people who make strenuous effort to convince committees along the lines in which they themselves have been misinformed. The fact that there are physicians among the antivivisectionists is evidence simply of the fact that such physicians have been too much interested in other matters to give attention to the proper acquirement of knowledge upon this subject.

Very respectfully, yours,

ROBERT T. MORRIS,
Professor of Surgery in the
New York Post-Graduate Medical School.

Hon. JAMES MCMILLAN.

To the foregoing the following reply has been received:

REPLY TO DR. MORRIS BY DR. ALBERT LEFFINGWELL.

SECRETARY'S OFFICE,
THE AMERICAN SOCIETY FOR THE
REGULATION OF VIVISECTION,
Aurora, N. Y., January 17, 1900.

DEAR SIR: My attention has been called to a recent letter of Dr. Robert T. Morris, of New York, addressed to yourself, apparently in opposition to the bill for the further prevention of cruelty to animals in the District of Columbia, which is now under consideration. As a physician who is not an antivivisectionist, and yet a cordial supporter of the proposed measure, will you permit me to state why the facts which Dr. Morris has brought to your notice have no perceptible relation to the question at issue and constitute no objection to the bill? It is hardly possible that Dr. Morris would have brought his experiments forward had he been better acquainted with the actual provisions of the proposed law.

Permit me to state two or three propositions, the self-evident character of which I doubt not will be evident to the committee.

1. This bill does not abolish vivisection in the District of Columbia, but simply places it under the control and supervision of the United States Government. It seeks to regulate the practice by restricting it (*a*) to qualified experts only; (*b*) to certain duly registered laboratories, and (*c*) to definitely useful ends.

2. As an objection to the measure it is utterly foreign to the question to dwell upon the value of any vivisections permitted by this bill for the purpose of conveying the false impression that such useful investigations are prohibited. When this is done from ignorance of the bill—as doubtless in the present instance—it may be regarded merely with regret. When done designedly and solely with intent to deceive and to create prejudice that ought not to exist, it argues dishonesty and contempt of truth.

3. As an objection to this bill it is pertinent to dwell upon the value to humanity of any phase of animal experimentation when it has first been shown that such useful investigations are prohibited by the measure under consideration.

I do not hesitate to affirm that of the great mass of facts and statements regarding the value of vivisections with which you have been

overwhelmed in the past, and with which you are almost certain to be overwhelmed in the immediate future, *fully 90 per cent have no possible relevance to a measure which distinctly permits them to be done.*

Permit me to illustrate the foregoing propositions. Let us imagine that this bill, so violently opposed, had become a law a year ago. Suppose that now, for the first time, Dr. Robert T. Morris desired to make, here in the District of Columbia, precisely the same investigations as he has described, would his way be blocked by the law? We can see at once that if these experiments could be done by him, his argument therefrom against this bill is wholly valueless. What would be the procedure in the hypothetical case I have suggested?

1. The first question which the Commissioners of the District of Columbia would be called upon to decide is that raised by section 4 and section 7, as to the fitness of the applicant desiring to vivisect. Is Dr. Robert T. Morris a duly qualified and proper person to be intrusted with the responsibility of performing experiments upon living animals? In the present case, I have no reason to doubt his qualifications, and the proper license would be accorded him without question. I know that objection is raised to this provision of the bill; it is argued that the United States Government should have no right to decide what men may or may not vivisect animals. One memorial against this bill, signed, it is true, by the leading vivisectors of America, affirms in the most unqualified manner that "unnecessary and offensive in the highest degree would it be * * * *by legislation of any kind* to attempt to dictate or control how, *and by whom*, or for what purposes * * * in the institutions of the higher learning, experiments shall be made."[1]

Now, sir, we who support the bill protest against that view. There is a class of men who, in the interest of humanity, should never be allowed to touch an animal for purposes of vivisection, or even to be present when a vivisection is going on. When Dr. George M. Gould, one of the leading medical writers in America to-day, is forced to admit that there are men now practicing vivisection in this country who are "without judgment to carry out, without true scientific training or method," and whose vivisections are made "*only in the interest of vanity;*"[2] that there are certain "conceited jackanapes" whose vivisections are done "to minister to egotism" and that certain American vivisectors are a "*disgrace both to science and humanity;*" when Dr. Theophilus Parvin, of Jefferson Medical College, declared, in the presidential address before the American Academy of Medicine, at Washington, D. C., May, 1891, that there are American vivisectors who "seem, seeking *useless* knowledge, to be blind to the writhing agony and deaf to the cry of pain of their victims, *and who have been guilty of the most damnable cruelties*," I think, sir, that they indicate a class of men who should never be permitted to torture animals for such vile purposes and such ignoble ends.

I but touch the shadow of an awful mystery when I say that one of the most horrible forms of mental and sexual perversion is displayed in the torture of animals and human beings; that a recent writer, Dr. Krafft-Ebing, of the University of Vienna, declares that there are "numerous cases" of beings in human form who "care only for the sight of suffering" and who "*make use of the sight of dying animals or*

[1] Report 1049, page 135, Fifty-fourth Congress, first session.
[2] *Address* before American Academy of Medicine, May 2, 1896.

torture animals to stimulate their lust;" and regarding the land where vivisection is no more free than it is to-day in the District of Columbia the charge has publicly been made: "*En France, on prolonge les vivisections pour se procurer d'infames plaisirs.*" I do not need to hold this abomination into any clearer light; every intelligent physician over 40 years of age is perfectly aware of it. And when associations of American vivisectors "protest" against the right of Congress to declare who may and who may not experiment on living animals in the District of Columbia, they simply denote a willingness to sacrifice the welfare of society to the freedom of vivisection. Outside the ranks of the clique to which these men belong, I do not believe there are many in the medical profession in this country, who would not affirm that those who find pleasure in torture should never be permitted to satisfy their depravity under the guise of scientific investigation. To prevent them is one of the objects of this bill.

In regard to a man of the established reputation of Dr. Morris, there would be no hindrance. We are justified in assuming that the requisite license would be granted without hesitancy.

II. The next step would be the registration of the place "in which any such experiment is to be performed," as required by section 3. Such place would be open to inspection by officials appointed by the President of the United States, according to section 6. Where is the hardship here? Surgeon-General Sternberg has declared that the laboratories of his Department are "open to inspection," and that "if any reputable person in the city desires to visit our laboratories and see what is done there *he will not be refused.*"[1] What valid objection can there be to official visitation of places so open to the general public?

III. Having procured his license and registered his laboratory, is there anything in the law which would prevent Dr. Morris from making the series of experiments which he has described? These are as follows:

1. For the better surgical treatment of adhesions following peritonitis, to make tests of surgical procedure upon rabbits, "chloroforming and examining the rabbits at such steps in the experiment as seemed desirable."

2. For the better surgical treatment of certain effects following operation for appendicitis, to make tests of surgical procedure upon dogs and rabbits.

3. For improved methods of removing dead bone and to test causes of previous failures, to experiment on the upper shell of a living turtle.

4. For demonstrating that abdominal supporters are unnecessary after certain operations, by experimentation upon rabbits.

5. For the confirmation of published reports of certain improved methods of surgical procedure in operations upon the intestines, by experimentation upon rabbits. We are informed that these experiments revealed a danger in the operation before unrecognized.

6. For the discovery of some improved method of "curing tuberculosis of the peritoneum," by experimentation upon rabbits.

Would these experiments be prohibited by the bill now before you? On the contrary, *every one of them would be permitted.* Section 2 says:

(*a*) "The experiment must be performed with a view to the advance-

[1] Report 1049, page 50.

ment by new discovery * * * of knowledge which will be useful for saving life, or prolonging life, or alleviating suffering; and

(*c*) "The animal must, during the whole of the experiment, be completely under the influence of ether or chloroform sufficiently to prevent the animal from feeling pain, *excepting only* that in so-called inoculation experiments or tests of drugs or medicines the animal need not be anæsthetized, nor killed afterwards, nor in tests of surgical procedure need animals be kept completely anæsthetized during the process of recovery from the surgical operation."

The only other clause in the bill of a restrictive nature, so far as the experiments of Dr. Morris are concerned, is one excepting man's faithful companion—the dog—from painful experimentation, unless that animal is alone available for the purpose of the investigation. In his second series of experiments, I notice that dogs are used. If it were necessary that this animal be used instead of other animals, in such experiments as those of Dr. Morris, there is nothing in this bill that prevents their use. I have quoted, I think, every provision of this bill which has the slightest relation to the experiments of Dr. Morris. I have demonstrated that none of them would hinder the investigations he so highly estimates, and I submit, therefore, that they constitute not the slightest objection to the measure under your consideration.

"But," you may say, "how comes it that from every part of the United States the committee has received letters and memorials from physicians and surgeons, from medical societies and scientific associations, protesting against this bill? How is it possible that intelligent men, like Dr. Morris, should have so utterly misconstrued and mistaken the provisions of this measure?" The reply to that question is simply this: The bill has been persistently and purposely misrepresented. Notwithstanding the provisions of the bill permitting every phase of useful experimentation, notwithstanding the fact that experiments in bacteriology (which, as Dr. William C. Woodward, of the District of Columbia, testifies, constitute "nearly all of the vivisection done in this District") are specifically permitted by this measure in section 2*c*, yet word has been sent out to the members of the medical profession throughout the United States that you are to consider a bill *prohibiting vivisection*. As an illustration of the value which some men place upon accuracy, let me quote from the appeal to the medical profession issued last month by the president of the American Medical Association, Dr. W. W. Keen.[1]

"The cause of humanity and scientific progress is seriously menaced. Senator Gallinger has again introduced into Congress the bill for the further prevention of cruelty to animals in the District of Columbia, which he has so strenuously and misguidedly advocated in the last two Congresses. Twice the Committee on the District of Columbia has, also unfortunately and misguidedly, reported the bill with a favorable consideration. It is speciously drawn, to seem as if it were intended only in the interest of prevention of cruelty to animals; but the real object is, first, *to prohibit vivisection*, and, second, to aid the passage of similar bills in all the State legislatures.

"It hardly needs to be pointed out that this would seriously interfere with or even absolutely stop the experimental work of the Bureau of Animal Industry and the three medical departments of the Government—the Army, the Navy, and the Marine-Hospital Service.

[1] Italics mine.—A. L.

"* * * *I take the opportunity of appealing to the entire profession of the country* to exert itself to the utmost to defeat this most cruel and inhuman effort to promote human and animal misery and death. * * * It is of the utmost importance that *every physician who shall read this appeal shall immediately communicate, especially, with the Senators from his State*, shall also invoke the aid of Representatives from his or other districts in his State, and by vigorous personal efforts shall aid in defeating this bill.

"It is also especially requested that all the national, State, and county societies, at their next meeting, take action looking toward the same end." The writer then proceeds to give the names of every Senator upon the Committee on the District of Columbia and adds: "Personal letters may be addressed to them or to other Senators. Petitions should be addressed to the Senate of the United States."

Here is the cause of that unanimity of protest which, apparently, so spontaneously has arisen against this simple measure, drawn in the interests of humanity and science. Of the physicians who have presented resolutions and presented personal appeals to individual Senators and Representatives, as advised by Dr. Keen, it may be doubted if one in a hundred has ever read the bill, or has any further knowledge of its provisions than that the president of the national association of medical men has declared that its real object is to "prohibit vivisection." It is, perhaps, conceivable that the president of the American Medical Association himself has never read the bill, and that we must go even higher to find the author of the false statement that this bill which I have analyzed "prohibits" the practice which it so carefully guards. Sir, I do not trust myself to speak of the honor of any scientific man who, in order to inflame the minds of the medical profession against a measure so moderate, so conservative of their interests, and so fair in every way, can bring himself to denounce it through the length and breadth of the land as having for its object *the prohibition of vivisection*. I can not believe that in the long run such a method of controversy can prevail. It is ever a poor cause that finds it necessary to seek the aid of untruth for its advancement or defense.

I have the honor to remain, yours very truly,

ALBERT LEFFINGWELL, M. D.

Hon. JAMES MCMILLAN,
United States Senate, Washington, D. C.

ADDITIONAL STATEMENT OF DR. MATTHEW WOODS, OF PHILADELPHIA.

According to the plan we had arranged for the discussion of Senator Gallinger's bill for the further protection of animals from cruelty in the District of Columbia, it was decided that after the opening speech by Mr. Perry, I, as one of the physicians in favor of the bill, should lightly sketch the absurdities, inutilities, and horrors of vivisection, and urge the necessity, because of its liability to abuse, for having it brought under legal regulation; and Dr. Leffingwell, with his ample qualifications, in a concluding speech, after both sides had been heard from, was to have corrected the misstatements of the opposition.

Dr. Leffingwell, however, because of an unexpected turn in the discussion, found it necessary in his splendid remarks to deviate from

the original plan, so that it remains for me to take up as far as I can find time the arguments, or rather assertions, of the various speakers and correct them.

I regret the necessity for this, but the needs of the case demand it, and I obey.

We do not often have the opportunity of hearing the subject discussed by so many capable and directly interested persons as appear on the opposite side, most of the speakers being vivisectors.

The reputations of some of them as specialists give so much importance to even their merest unverified assertions that it would be a serious injury to our cause to permit any stultification of humane conduct that might occur, by allowing their errors of statement, deduction, and insinuation to pass undetected, uncontradicted, and uncondemned.

Before proceeding to an examination of the "arguments" advanced by the opposition, I would like to make clear a remark, an important one to us, that in my previous paper seemed to elicit but a smile of incredulity from our opponents.

I said that medicine in its broad, philosophic entirety could be understood but by two classes of people, the enlightened layman and the physician knowing all departments of medicine, rather than the mere specialist, often only inadequately acquainted with but one.

Prof. Samuel Gross, of Philadelphia, was in the habit of saying "The doctor who knows nothing but medicine does not know that." We might confine the axiom within narrower limits and say the specialst who knows nothing but his specialty does not know that.

The allusion to the enlightened layman, as before mentioned, elicited but an expression of doubt, and yet our next speaker, Dr. Cochran, who is not a doctor of medicine, proved himself the enlightened layman who knew medicine not only in its broad, philosophic entirety, but its intimate therapeutic and physiological ramifications as well, while on the other hand the specialists who came after him did not, as will be seen later on, exhibit that liberal and profound knowledge of the subject that always wins, if not conviction, at least respect.

To further elucidate what we have said of the enlightened layman with his wider horizon, knowing medicine at least as well as those laboring in the rut of a specialty, we will ask the committee to merely use their memory.

Herbert Spencer was not a physician, but can you be familiar with his writings without knowing that his grasp of medicine indicated a knowledge of its fundamental principles and its details beyond the reach of the mere specialist, and who has spoken against the cruelty of unlimited vivisection with greater authority than he?

Charles Darwin, Sir Arthur Phelps, Frank Buckland, Robert Boyle, Cardinals Newman and Manning, vice-presidents of the English anti-vivisection societies, Canon Wilberforce, George MacDonald, Robert Browning, Alfred Tennyson, William Watson, John Ruskin, who gave up a professorship in Oxford because that university tolerated vivisection. All of these are laymen in favor of the regulation of vivisection, most of them in favor of its abolition, who knew medicine so profoundly that anyone reading their writings must be convinced of it; and George Eliot, as the admirers of Middlemarch know, proves that even a laywoman, never having specifically studied medicine, knows more about the details of the art and science of legitimate practice, and more of the methods of those adroit ones who meander on the margin

of quackery for a purpose, than any man teaching a branch of medicine in a medical college or practicing a single section of it.

I do not mean that the specialist is always the man disqualified by a too exclusive devotion to a narrow groove of medicine from deciding questions of moment to the profession at large, for there are differences in specialists; but I do maintain that there are men and women outside of the profession also qualified to decide intelligently the right and wrong, utility and inutility, of certain practices, winked at by the profession, and that yet are abominable, demoralizing, and unjust.

We put in evidence of this fact the above-mentioned illustrious names, not because they are exceptions, but because they are familiar. We could adduce many such, for it is not always the men in the thick of the fight who know the purpose of the battle, but sometimes also those who calmly look on—just far enough away not to be distracted by the merely personal element.

I am particular to emphasize this claim, because, first, our opponents are constantly citing the inadequacy of nonprofessional knowledge, and never lose an opportunity—they are so infallible themselves—of holding up to derision evidences of fallibility on the part of our coworkers; and second, because I feel that, perhaps, this contest may have to be ultimately won by non-medical combatants.

You will remember, too, that this method of procedure, on the part of those presumably entrenched in the confidence of the public against their opponents is old enough to have had its origin in Egypt, and to have been used by every overconfiding order ever since.

It was practiced by the Sanhedrim and all the orthodox against the promulgation of Christianity.

They said "these people, fisher folks, taxgatherers, carpenters, doctors, artists, poets, tentmakers, and women, not having specifically studied theology, not familiar with the subtilities of the schools, the original languages and dialects of scripture, what do they know about the establishment of a new religion of mercy?" The same methods are used against us.

Thus you see that anything that opposes a system under which people grow fat, either in reputation, gold, or adipose, is heresy—the heretic an ignorant pest. But "the race is not always to the swift, nor the battle to the strong."

The very nature of the antivivisection movement precludes the participation of physicians to any great extent, for how can the members of an engrossing profession, unless very fortunately placed, afford either the loss of time or reputation necessary in order to draw the attention of the public to the parasite vices of their own calling without incurring the penalty of misrepresentation with all its concomitant evils.

You saw this morning an illustration of the penalty a man must pay for such independence, when two men of otherwise good conduct did not hesitate to give the lie direct to a dead, yet distinguished, leader—you would have thought death might have protected his memory from slander—and by an unbecoming and unprofessional charge attempted even in public, to compromise his standing, simply because during his beneficent life he dared to speak out his convictions against vivisection, and this, too, of a man who was the pioneer and foremost of aseptic abdominal surgeons; a man who, in dying, said he wanted inscribed upon his tomb that "vivisection was worse than useless—that it was misleading."

When even death is not sufficient to protect such a fame from slander, what may not vivisectional rancor attempt, to the opponents of vivisection, who in the less conspicuous paths of the profession pursue the even tenor of their way.

It is not *esprit de corps*—the animating spirit of a collective body—as is often claimed, but this feeling of being misunderstood, that I am afraid may always keep the profession in general from joining hands with the laity in opposing the abuses of vivisection.

Then again, doctors, as a rule, are not interested in vivisection. It never comes into their lives.

There are about 160,000 physicians in the United States. Not 400 of these are vivisectors. There are, perhaps, as many people vivisectors outside of the active members of the medical profession as in it.

The great balance of doctors, therefore, who do not vivisect and who have never even seen an apparantly painful experiment, can not be interested in the reform of a subject of which they know so little. Most of them think all painful experiments are done under the influence of an anæsthetic and without the infliction of pain, and so little do they know, that when you tell them the antivivisection societies do not oppose these they are astonished.

Question any general practitioner on the subject and you will be surprised how little he knows correctly about vivisection, except what the antivivisection societies have told him.

It is the tragedies enacted in secret by the four hundred, with their satanic ingenuity and cold-blooded indifference to suffering, that excites the antagonism of the humane and that has caused a demand for the enactment of this bill.

Take for example the following from the American Journal of Medical Sciences, July, 1882, page 71 (extraneous matter omitted), as a rather mild illustration of the sort of work to which I refer:

"I have demonstrated," the writer says, "by repeated experiments that my saliva * * * injected into the subcutaneous connective tissue of a rabbit invariably causes death, usually within forty-eight hours. * * * I think I am safe in stating that I have repeated the experiment at least twenty-five times with my own saliva. * * *

"I beg those who undertake to repeat my experiments to observe that my saliva * * * produces results recorded. * * *

"The saliva of four students, residents of Baltimore, gave negative results. * * *

"In my experiments the rabbits were commonly found dead or dying on the second morning after inoculation. * * * The constant pathologic lesion found by me was a diffuse cellulitis or inflammatory œdema extending in all directions from the point of injection.

"The spleen was usually greatly enlarged, the liver was frequently dark in color and gorged with blood." And yet this is one of the men of whom Dr. Keen in his Sunday school Engilsh says "love animals more wisely than the ladies and gentlemen of the opposite side."

Now think for a moment of the significance of that cold-blooded account, its shamelessness, the creatures, its victims lingering in agony for two days with spleen and liver and muscular tissue swollen with septic inflammation until death from exhaustion came to their relief, then think of this full-grown man with the poisonous saliva, "cruel as a child," as Tennyson says, "before it grows to pity," inviting

young men to do the same thing over and over again, and not being ashamed to sign his name to this barbarous description.

Now, when you find this man among the more persistent opponents of Senator Gallinger's bill, do you think it strange? Do you not discover in this fact, rather a reason why the bill should become law?

Sir John Falstaff said that he was "not only witty himself, but the cause of wit in others." Vivisectors are not only cruel themselves, but often the cause of cruelty in others, and need to be restrained by law.

To return to the point that none but doctors of medicine know enough to talk intelligently about the regulation of vivisection we might refer to people in all ranks of life who prove the contrary.

From Elizabeth to Victoria, inclusive, is a long stretch, and yet the span between is filled with laymen knowing medicine, but opposed to vivisection.

Shakespeare was among the first of moderns who condemned it, because of its effect in "hardening human hearts," as you may see by reading Cymbeline, and would prohibit its use, at least by women.

Dr. Mary Putnam Jacobi does not agree with Shakespeare, because she manifests both in her life and writings that even women ought to vivisect.

Wilkie Collins was not a doctor and, like Professor Keen, never, perhaps, beheld or did a vivisection, but let any doctor read the books in which by the use of narrative, he shows his utter condemnation of vivisection and see if he was not qualified to express a medical opinion; or, to return to the other extreme, Shakespeare was not a doctor, but what medical specialist ever exhibited a conception of the vast scope of the profession equal to his? His perception of the function of the physician, interpretation of the significance of symptoms never observed before, his tabulation of certain phases of disease, recognition in that dark therapeutic age of the impotence of drugs, in ways the profession thought omnipotent, his observation of the incipient indication of mental disorder, first recognized by him, his elucidation of the prodroma of senility, his mastery of the art of prognosis and diagnosis, differentiation of delirium never understood until his characterization of it, his comprehension of the "little world of man," normal and distempered, his knowledge of every department of medicine, so complete that after a lapse of nearly three hundred years it is possible to find in him to-day a quotation fit as a motto for a text-book on every branch of even modern medicine.

What reader can peruse Hamlet, Lear, Timon of Athens, Macbeth, or the Rape of Lucrece, to mention the more familiar examples, and, seeing the deep places of medicine made luminous as if by lightning flashes by this layman, then assert that medicine can be understood only by doctors, and that physicians are the only people qualified to enact laws for the regulation of its abuses?

Is it not rather arrogant in our antagonists to insinuate that our coworkers, which include, as the committee well know, college presidents and professors, poets, lawyers, historians, great critics, artists, statesmen, cardinals, bishops, and other clergymen, merchants, journalists, and men and women distinguished in all the higher walks of life are incapable of having a correct opinion of such a subject as vivisection, because its comprehension implies a knowledge of physiology

and anatomy, when in these days boys and girls in their teens know not only anatomy, but comparative and regional anatomy as well, and are familiar, as the curriculum of nearly every public school indicates, with the physiology of digestion and of the special senses, of the lympathic system, circulation, respiration and reflex action, the effect of poisons and drugs, and know very well, Dr. Jacobi to the contrary notwithstanding, "that when the spinal cord is cut there is no feeling below the point of separation."

Most of the great men in every department of human endeavor are in favor of the restriction of vivisection. Can it be then possible, when even children know so much, that they know so little about medicine that they can not tell the difference between cruelty and mercy?

Is it because they desire to retard scientific progress, as our opponents imply? And must we wait and animals suffer until our people are experimental physiologists before we can enact laws to save helpless creatures from prolonged horrors infinitely worse than anything a normal imagination can conceive?

In replying to the "arguments" of the opposition, we begin with those of Dr. Keen, who, in his opening remarks, instead of confining himself to a discussion of the bill, irrelevantly asserted in the usual way, first, that the medical opponents of vivisection were men without reputation in the profession.

Be it remembered, also, that Dr. Keen, in the capacity of president of the American Medical Association, was the author of the letter published in the organ of that society, referred to adversely by Dr. Leffingwell and Senator Gallinger.

The letter purporting to be a translation of Senator Gallinger's bill into nursery English, for the babes of the profession of too tender an age, it would seem, to understand, the bill itself is from beginning to end a misrepresentation, as the committee may see by comparing Dr. Keen's presumably paraphrastic letter with the bill itself.

We offer both in evidence, and beg the committee to see in this unnecessary communication to the profession of the United States an illustration of the way animosities and prejudices have been excited so as to get medical men to oppose a paper they had not read and did not understand, and also to show how a handful of men have succeeded in creating a tempest in a teapot over a matter that has no more to do with what they say it has to do than temperance has to do with excess, for Senator Gallinger's bill not only does not attempt to abolish vivisection, it permits it, and even puts it under legal protection.

Dr. Keen's assertion that medical opposition to vivisection has come from men of no reputation in the profession, seems also wide of the mark, as may, I think, be seen by the following array of illustrious physicians who in all ages up to the present time have expressed themselves as not only in favor of the mild control called for by the present bill, but who also go a step farther and desire the entire abolition of vivisection.

We shall confine ourselves to a single quotation from one of the classic medical authors—Celsus, who in the first century wrote:

"It is alike unprofitable and cruel to lay open with the knife, living bodies, so that the art which is designed for the protection and relief of suffering is made to inflict injury, and that of the most atrocious nature.

"Of the things sought for by these cruel practices, some are altogether beyond the reach of human knowledge, and others could be ascertained without the aid of such wicked methods of research. The appearances and conditions of the parts of a living body thus examined must be very different from what they are in the natural state. If, in the entire and uninjured body, we can often, by external observation, perceive remarkable changes produced by fear, pain, hunger, weariness, and a thousand other affections, how much greater must be the changes induced by the dreadful incisions and cruel mangling of the dissector in internal parts, whose structure is far more delicate, and which are placed in circumstances altogether unusual."

These remarks of Celsus were made in reference to the inspection of the living bodies of human criminals who were handed over for this purpose to the "physiological laboratories" of the medical school of Alexandria, and probably to other places of study.

The objections to such researches, so strongly urged by Celsus, apply with double force to experiments on lower animals, where the differences of function and of structure must further diminish the chance of light being thrown on the physiology of man in the natural condition.

Clinton Wagner, M. D., professor New York Post-Graduate Medical School and the University of Vermont, writes: "I sincerely hope that the efforts being made for the abolition of vivisection may succeed at an early day."

Dr. Charles Bell Taylor, F. R. C. S., writes: "The practice of cutting open living animals, literally the practice of dissecting them alive, in the supposed interests of science, which is called vivisection, is in my judgment, to be condemned—

"First. Because there is really no necessity for it.

"Second. Because it has been proven to be not only useless, but misleading.

"Third. Because it takes the place of other methods of study and observation which are infinitely preferable, and to which no one can possibly object; and

"Fourth. Because it is a gross and cruel abuse of the power which God has given us over the lower animals, and virtually a surrender of our chief claim to mercy for ourselves."

Sir William Fergusson, F. R. C. S., surgeon to the Queen: "I am not aware of these experiments on the lower animals having led to the mitigation of pain, or to improvement as regards surgical details." (Evidence before Royal Commission, 1876.)

Sir Thomas Watson, M. D., ex-president Royal College of Physicians, said: "One of the greatest physicians who ever lived, Sir Thomas Watson, told me himself, not long before he died, that young men had to unlearn at the bedside what they had learned in the laboratory." (From a speech of Canon Wilberforce, 1892.)

Surgeon-General Charles Gordon, C. B., honorary physician to the Queen, said: "I hold that the practice of performing experiments upon the lower animals, with a view to benefiting humanity, is fallacious." (Speech at the Westminster Palace Hotel, June 22, 1892.)

Sir Benjamin Ward Richardson, M. D., F. R. S., wrote: "Pain, when it is excited and sustained in any animal, obscures and falsifies for the time all the other vital phenomena which admit of investigation. In plain words, it is utterly impossible to observe natural functions under

the shadow of pain, either in man or animals, for he who tries to observe under these circumstances must make so many allowances for the circumstances under which he is observing them, he finds it extremely difficult, even if it be possible, to be precise in his conclusions. I am certain that vital experiments, to have any value at all, must be conducted without any trace of the disturbing influence of suffering, whether man or lower animal be the subject of observation, nor do I stand alone in this view. I have heard it expressed by Sir Benjamin Brodie, Dr. Baly (perhaps the most accomplished and learned physiologist I have ever met), Sir John Forbes, Dr. W. B. Carpenter, and Dr. John Snow. Sir Charles Bell and Alexander Walker also shared this view that pain as a disturbing influence is of so serious a character that, quite apart from sentiment on the matter, I think it best to exclude it altogether. It must deceive."

William F. Clarke, M. D.. B. Sc., London, says: "I have always thought this (vivisection) to be a prostitution of medicine. Physiological research is as distinct from the practice of medicine as is astronomy from navigation, and any attempt to combine the two will endanger our position in the eyes of the public." (Letter in the Lancet, November 26, 1893.)

Dr. Arthur Roberts, M. R. C. S.: "I have been a medical officer of health for over sixteen years, and I am convinced that the only way to prevent infectious diseases, in fact, any disease, is to maintain the body in as good health as possible, and provide for the people pure air, pure water, good drainage, and wholesome food. Teach the people the simple laws of health, how to keep clean, ventilate their houses, etc., and you will do more to prevent disease than all the vivisectionists' experiments in the world. Leave the poor dumb animals alone, and educate the people. Let each one ask himself the question: Why this waste of money, why this torturing of dumb creatures, when the cure is open to every one?" (Extract from letter to Leeds Mercury, December 10, 1893.)

Dr. J. S. Harndall, royal veterinary surgeon: "There is no proof that the millions of animals that have been cruelly tortured and sacrificed to the whims of scientists have produced the slightest benefit to science."

S. Mills Fowler, M. D., professor of the practice of medicine in Dunham Medical College, Chicago: "I am utterly opposed to the practice of vivisection. The brutality manifested in its employment is a disgrace to civilization. It disgraces not only those who employ it, but also those who witness it. It should receive the unqualified condemnation of every civilized person."

Forbes Winslow, D. C. L. Oxon, M. R. C. P., London, physician to the British Hospital for Mental Diseases; physician to North London Hospital for Consumptives, etc.: "In my opinion, vivisection has opened up no new views for the treatment and cure of disease. It is most unjustifiable and cruel, and in no way advances medical science. I do not believe in any of the so-called experiments of these "faddists," especially those relating to brain operations on monkeys, and the consequent theory of cerebral localization. I have probably more experience than many of these experimenters who have given their opinions to the world as based on what they have done, and I beg leave to express my utter disbelief in the usefulness of such experiments, and to discredit there being followed by any good results to mankind or to science in general."

Prof. William J. Morton, M. D., professor of nervous and mental diseases at the New York Post-Graduate Medical School and Hospital, New York City, has written: "I only wish I could state the above sentiments stronger. If mankind suffers from disease, it is its own fault, to be cured by rectification of the causes which lead to it; and it is subversive of the high and moral order of the progress of humanity to inflict pain or death upon other living animals to abolish or minimize disease or suffering due to mankind's own fault."

Francois Achille Longet, the French physiologist, writes: "Experiments on animals of a different species, so far from leading to useful results as regarded human beings, had a tendency to mislead us. In seeking to benefit mankind by vivisection, it would be necessary to have recourse to pathological facts founded on experiments on human beings."

J. D. Buck, M. D., F. T. S., professor of nervous diseases and the principal of therapeutics and Dean of Pulte Medical College: "When the returns are all in from this age of experimental science, it is my firm conviction that it will be abundantly proven that vivisection has added not a single fact to knowledge regarding the functions of man, or the nature or cure of disease, that was not already essentially in our possession or could not be derived from other sources. Scientifically, I believe vivisection to be useless as a means of obtaining knowledge of the nature or needs of man."

H. Clay Paddock, M. D., New York City, writes: "I beg to say that I am opposed to vivisection, for my own experience of years in the laboratory and that of others have convinced me that those experiments are misleading, useless, and cruel to a diabolical degree."

Dr. J. M. Stewart, president of the Peoria County (Ill.) Scientific Association writes: "Vivisection is horribly cruel and practically useless."

James W. Thompson, M. D., New York, testifes: "I do not consider there is any excuse for vivisection under any circumstances whatever. The whole diabolism leads astray and prevents the minds of those who pursue the ignis fatuus from being receptive of truths that would humanely help suffering humanity."

Albert Leffingwell, M. D., formerly teacher of physiology, Polytechnic Institute, Brooklyn, N. Y.: The result of experimentation in many directions is to plunge the observer into the abyss of uncertainty. —Lippincott's Magazine, August, 1844.

Dr. Charles Clay: "As a surgeon I have performed a very large number of operations, but I do not owe a particle of my knowledge or skill to vivisection. I challenge any member of my profession to prove that vivisection has in any way advanced the science of medicine or tended to improve the treatment of disease."

The programme of the practical course of institutes of medicine, under the joint direction of Trinity College, Dublin, and the College of Physicians, concluded with these words: "Vivisections are absolutely forbidden."

Henry J. Bigelow, M. D., professor of surgery in Harvard University, writes: "How few facts of immediate considerable value to our race have of late years been extorted from the dreadful sufferings of dumb animals, the cold-blooded cruelties now more and more practiced under the authority of science? The horrors of vivisection have supplanted the solemnity, the thrilling fascination, of the old

unetherized operation upon the human sufferer. For every inch cut by one of these experimenters in the quivering tissues of the helpless dog or rabbit or guinea pig let him insert a lancet one-eighth of an inch in his own skin, and for every inch more he cuts let him advance the lancet another eighth of an inch, and whenever he seizes with the ragged forceps a nerve or spinal marrow, the seat of all that is concentrated and in exquisite agony, or literally tears out the nerves by their roots, let him cut only one-eighth of an inch farther, and he may have some faint suggestion of the atrocity he is perpetrating when the guinea pig shrieks, the poor dog yells, the noble horse groans and strains, the heartless vivisector perhaps resenting the struggle which annoys him.

"My heart sickens as I recall the spectacle at Alfort, in former times, of a wretched horse, one of many hundreds, broken with age and disease resulting from lifelong devotion to man's service, bound upon the floor, his skin scored with a knife like a gridiron, his eyes cut out, his teeth pulled, his arteries laid bare, his nerves exposed and severed, his hoofs pared to the quick, and every conceivable torture inflicted upon him, while he groaned and gasped, his life carefully preserved under this continued and hellish torment from early morning until afternoon for the purpose, as was avowed, of familiarizing the pupil with the motions of the animal. This was surgical vivisection on a little larger scale and transcends but little the scenes in a physiological laboratory. I have heard it said that 'somebody must do this.' I say it is needless. Nobody should do it. Watch the students at a vivisection. It is the blood and suffering, not the science, that rivets their breathless attention. If hospital service makes young students less tender of suffering, vivisection deadens their humanity and begets indifference to it."

Prof. James E. Garretson, M. D., senior professor of surgery, Medico-Chirurgical College, Philadelphia, and one of the vice-presidents of the American Antivivisection Society, wrote: "I am without words to express my horror of vivisection, though I have been a teacher of anatomy and surgery for thirty years. It serves no purpose that is not better served after other methods."

I beg the privilege in this connection to quote from Dr. Samuel Johnson. To be sure, he was not a doctor of medicine, but he associated so much with medical men that he may almost be regarded as a member of the order. Besides, a citation from Ursa Major (see The Idler) can never be uninteresting. He says:

"I know not that by living dissections discovery has been made by which a single malady is more easily cured. And if the knowledge of physiology has been somewhat increased, he surely buys knowledge dear who learns the use of the lacteals at the expense of his own humanity. It is time that universal resentment should arise against those horrid operations which tend to harden the heart and make the physician more dreadful than the gout or the stone."

The above expressions of medical opinion in opposition to vivisection should be accorded great weight. It refutes all that has been claimed by the opposition, and, besides the long experience and recognized ability of the gentlemen we have quoted, fully qualifies them to speak with authority on the subject. And also, for the reason that the spirit of professional bias, that is a strong bond of union between members of the same profession, would naturally have compelled them to sus-

tain a system advocated by their professional brethren had not conscience and experience alike prevented.

Surely after this list of celebrated surgeons and physicians opposed to vivisection Dr. Keen's assertion that "medical opposition to vivisection comes from men of no reputation in the profession" will also need modification.

Dr. Keen's second assertion, namely: "There is not a day that goes by that I do not use for the advantage of my fellow human beings the results of vivisection. Take * * * the question of brain surgery. It has been stated with singular infelicity by Dr. Woods that the presence of a brain tumor outside the motor area of the brain can not be diagnosticated and that practically brain surgery is useless."

After this utter misapprehension, misquotation, and misinterpretation of what I said (see my opening paper) Dr. Keen exhibited a tumor that he had transferred from a man's brain to a glass bottle as a proof that progress in brain surgery was due to vivisection.

Unfortunately he did not exhibit the man, which would have been more to the point, that we might have with greater satisfaction decided results.

The trouble with most operations on the brain, especially when founded upon animal experimentation, is that the only part of the patient left above ground after the operation is the tumor in a surgeon's bottle and the trephined cranium carefully preserved in a cabinet to show how near the surgeon came to locating the growth. So that, we repeat, it is a pity Dr. Keen did not produce the patient as well as the tumor. He would have been a curiosity.

We have brought forward a number of celebrated surgeons, physicians, and brain specialists (see list of authorities) who do not agree with Dr. Keen in what he says about the gain, brain surgery derived from vivisection, and if we may be permitted to refer to our own experience, which in this department of medicine is unusually large and satisfactory and perhaps more extensive than Dr. Keen's, we would say that surgical operations on the brain based upon experiments upon the lower animals have not given nearly such good results as comes from treatment by medicine, except in such cases as before mentioned. Where, then, is the utility of operations?

We have watched with much interest this branch of surgery because of our own experience in the treatment of epilepsy. Many of these unfortunates have been operated upon by men who believe in the utility of vivisection, but where are the cures? Many, on the contrary, have died, and not many of them, we believe, would have been operated upon at all had it not been that surgeons were misled by the results of experiments made by physiologists upon the brains of monkeys.

The lower animals lived after portions of the brain had been removed; men similarly treated died.

There is not a case of epilepsy on record thus treated that recovered, whereas numbers get well by treatment with medicine. All these deaths, therefore, and they are many, may be laid at the door of vivisection.

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[1]See "Some experiences and observations in the treatment of epilepsy, etc.," presented by me to the section on practice of medicine at the forty-eighth annual meeting of the American Medical Association, Philadelphia, 1897.

Of course I do not refer to application of the trephine for the treatment of epilepsy and removal of pressures, that was done frequently and successfully long before Horsley experiments, but rather to the cutting out of the diseased area. Trephining is of course limited to cases where the disease is due to injury of the skull or pressure from abscess, etc.

The first operation of this sort was done in 1705 by Guillaume Manquest de la Motte with partial success and repeated with complete success by Mr. Birch in 1804. Between 1804 and 1865 there are 50 cases on record (collected by Dr. James Russell, British Medical Journal, 1865) and of these 44 recovered, the results being satisfactory in 39 of them.

This paper of Dr. Russell's was published years before Ferrier and Horsley's experiments, so that the cases quoted have nothing to do with vivisection. The results of trephining for epilepsy, published since, are not so good as those published by Dr. Russell. Why? Because Dr. Russell's cases were based upon clinical observation. Most of the cases since, at least according to Dr. Keen's testimony, are based upon experiments upon animals. If Ferrier's experiments, therefore, have led to greater certainty in applying the trephine, why is it that the results in such operations are worse now than before Ferrier and Horsley misled certain brain surgeons by their experiments on lower animals?

Again, instead of what Dr. Keen quotes me as saying, I said the following:

"In spite of all these experiments it is still impossible to correctly locate a tumor or abscess of the brain outside the motor centers." I repeat this. I did not say diagnosticate, and I did not say "brain surgery was in consequence practically useless." Dr. Keen in misquoting me said this.

Only a few days previous to my having written that statement I heard a surgeon, holding in his hand the brain of a man who had died the day before of an operation for the relief of an abscess, say that "it was impossible to locate a tumor or abscess of the brain outside of the motor centers," and none of the surgeons present denied it. After this I questioned about it two well-known anatomists and surgeons, both demonstrators of anatomy in medical colleges, and both said it was impossible. Since, I have questioned a nerve specialist. He said it was impossible. I have since asked others; they have coincided.

Now, "upon what food doth this, our Cæsar, feed, that he hath grown so great?"

Is it at all likely that Dr. Keen knows some secret way of locating tumors unknown to the profession?

Dr. Osler's diagnosis means nothing that vivisection has taught.

Perhaps most lesions of the brain are in the vicinity of the fissures of Silvius and Rolando. Guess that location every time, and once in a while you will be right. This is not making a diagnosis.

Again, Dr. Keen's tumor does not disprove what I said about the danger of removing portions of the brain.

My words were: "Where is the surgeon to-day rash enough to attempt the cure of mental disorders, except in concussion and the like, by cutting away portions of the brain?" Dr. Keen produced his tumor to contradict what I said, but the tumor was not a portion of

the brain. This exhibition of bottled fibroid was specious only, a mere kindergarten lesson in sophistry, for that tumor was as distinctly separated from the brain anatomically and physiologically within the cranium as it was in Dr. Keen's bottle. It was a foreign growth within the cranium. In removing it he did not essentially remove any portion of the brain. The man may have had as much brain after its removal as before.

He furthermore quotes me as saying that "because brain tumors could not be diagnosticated, brain surgery was useless." I said neither, as may be seen by referring to my paper. Brain tumors can be and have been diagnosticated. I said "they could not be located outside of the motor centers." And Dr. Keen confesses that his "tumor was diagnosticated by reason, as Dr. Woods has admitted, of its motor symptoms largely." Neither did I say that "brain surgery was practically useless." I know the contrary.

It is possible to drain an abscess of the brain without killing the patient. It is possible to remove brain pressure by trephining and the patient still live. It is possible to scoop out portions of bruised brain and blood and comminuted bone without death to the patient. It is possible for a man to have had a crowbar go through his brain and intelligently attend to his business for years after. It is possible for men to have had two and three holes gouged out of their skulls, exposing the brain and lacerating the membranes, and afterwards attend to their usual avocation. These things were done and known long before Horsley, Yeo, or Ferrier ever attempted experimenting upon the brains of monkeys.

It is because men based their treatment on animal experiment instead of clinical observation that so many people have died in consequence of modern brain surgery. That some live is not because surgeons have been taught skill by vivisection, but because they keep themselves and their patients absolutely clean and practice a better technique.

Long before America was discovered, or vivisection dreamed of, trephining was commoner than now, and, judging from the number of prehistoric surgical crania in the National Museum here, far more successful. In ancient Egypt, too, trephining was successfully practiced, and yet Dr. Keen says that vivisection taught us almost all we know of brain surgery! Even if vivisection has taught us anything, it is about time that we should abandon this mediæval, unchristian, unreliable, unscientific method for something more humane and better.

Another assertion of our opponents, "There is not a day that goes by that I do not use for the advantage of my fellow-human beings the result of vivisection," is also difficult for us in favor of legislation to comprehend.

It is not good form to refer to personal experience, but in this particular I trust to be excused when I say that I see perhaps three times as many patients every year as Dr. Keen.

There is hardly a day when I can attend to all who desire my service.

Excepting diseases of the eye, I practice every branch of medicine, sometimes including surgery, but only doing minor operations when I have time and when I can get along with local anæsthesia.

As president of an antivivisection society I take pains to know what is being done in the way of experimental research, and yet I am not aware of the slightest addition to my success from vivisection.

The unitiated may think I lose by not being able to see in vivisection all that Dr. Keen sees, but I maintain that it is not I but Dr. Keen who is singular in his view.

All other physicians that I have spoken to on the subject, except those with a *penchant* for experimentation and with small practical experience, feel as I do.

Only a few weeks ago, while walking home from a medical gathering with a well-know professor in a medical college, he said, speaking of a certain active experimenter, "He has been vivisecting for a great many years; has written voluminously of his work. I have read most of it, and for the life of me I can not find a particle of information in all that he has written of benefit to me in my practice."

Dr. Keen's success, and with him the success of other contemporary surgeons of large experience, is not due to vivisection, as that word is understood by the laity and the general profession, but rather *ascepsis* and the practice of a better technique than that known to their predecessors, a practice and discovery which, if traced back, will be found to have had its origin in the old theory of spontaneous generation rather than vivisection. But admitting that *ascepsis* did have to do with animal experimentation, then it owes its existence to the sort of experiments (bacteriological) permitted by Dr. Gallinger's bill, for the bill permits experiments in animal therapy antitoxins and the injection of drugs into living animals.

Now if a small mortality list is a sign of success in a physician or surgeon (and I will admit that it is not always so), mine, as that of a man who has not been benefited by vivisection, can be seen by inspection of the mortuary list of the board of health any day. And I think it will be found of a creditable brevity, and will compare favorably with the record of any man.

Where, then, is the astonishing benefit derived from scientific cruelty thus vaunted by the champion of unlimited vivisection?

Dr. Keen's next claim, that "if the lower animals had insanity, we should know a great deal more about it than we now do," is a rather compromising one, and hardly admits of proof.

Animals are subject to two familiar varieties of insanity—rabies and acute mania which in young carnivorous animals is due, primarily, to teething, indigestion, and perhaps heat exhaustion.

We know from time immemorial that certain animals have been subject to these two varieties of insanity, and yet knowledge of this fact has not helped us a bit in the solution or treatment of similar diseases in man. Indeed, the fact that domestic animals, with their greater provocation, are so little liable to insanity that they are only subject to a few varieties of it, proves, on the contrary, that theories of mental disorder based upon experiments or observations upon the lower animals are not to be relied upon at all. The conditions are so different; the susceptibility so different; then there must be a cause for this difference inherent in the creatures themselves, and making such experiences uninterchangeable.

Again, all that Dr. Keen claims for vivisection in enabling the surgeon to operate successfully on liver and kidneys will admit of another explanation.

The great safety with which operations are done to-day is not because of any light thrown upon disorders by vivisection, but because surgeons make themselves and their patients asceptic, and because they know how

to avoid septicemia, the condition that made operations in the old way so frightfully dangerous.

It is not because surgeons are more skillful now than then, but because of the discovery of asceptic surgery.

Not many years ago a Gross or an Agnew did such a simple thing as the opening of a knee joint with fear and trembling because of the danger, often fatal, of suppuration.

Now any surgeon's apprentice can do this operation with safety, not because vivisection made the surgeon's apprentice more skillful than Gross or Agnew, but because of the exemption from death secured by ascepsis.

The man operated upon, however, may think the surgeon's apprentice a greater man than Agnew or Gross.

Keep patients, instruments, nurses, surroundings, and operators absolutely clean, and even a bungler can now do things with safety to patients that in the old way were sometimes fatal in a few hours.

What Dr. Keen says of ligatures and aneurisms, and safety in their use being due to vivisection, also will not stand the test of investigation, as may be seen by referring to a pamphlet entitled The Uselessness of Vivisection, by Lawson Tait, himself an authority on ligatures and the tying of arteries. We offer this pamphlet in evidence, feeling confident that when the committee reads what Mr. Tait says about the *differencs* between the blood vessels of the lower animals and man, they will be convinced that Dr. Keen's proposal for instituting a series of experiments on the arteries of dogs before trying another operation on the aorta of man will end only in confusion.

Let the doctor ligate the artery of the next patient in a more scientific manner than he did the one he told us about, and his success will be better, without submitting to the risk of being misled by the results of an experimental ligation upon the altogether different blood vessels of the lower animals. Besides, any neophyte in midwifery, in tying the umbilical cord, can demonstrate how to ligate an aneurismal aorta with safety—that is, as far as the mere ligation is concerned—without the necessity of resorting to experiments upon the lower animals.

Again, Dr. Keen's reference to the supposititious dangers of restrictive legislation, as illustrated by the refusal of a president of a humane society to lend him a dog as an aid to splicing a nerve in the leg of a patient, is a case more theatric than convincing, judging from the almost unanimous opinion of his medical fellow-townsmen.

The dramatis personnæ in this little bit of comedy were Mrs. R. P. White, wife of a prominent lawyer of Philadelphia, a broadly cultured woman, with a keen sense of justice and humor, president of the Women's Branch of the Pennsylvania Society for the Prevention of Cruelty to Animals, and corresponding secretary of the American Antivivisection Society, of which I have the honor of being president, and Dr. W. W. Keen, professor of surgery in Jefferson Medical College.

Dr. Keen does not love Mrs. White. Mrs. White laughs at Dr. Keen, and she follows up, in the way of counter claims, his public utterances about the victories of vivisection.

Some years ago he published a pamphlet, reprint of an address delivered before a graduating class of young girls from a female medical college in which he was a professor, entitled "Our recent debts to

vivisection." Mrs. White wrote a reply to this, of which it has been said that she proved every claim made by Dr. Keen to be without foundation.

Some time after occurred the episode of the surgeon, the dog, and the president of the humane society, referred to by Dr. Keen in his speech, in which he says that as professor of surgery he wrote an official letter to Mrs. White asking her (president of a humane society) to give him a dog for an experiment. Be it remembered that Mrs. White was forbidden by the written law of the society to allow animals under her protection to be used for such a purpose. The case had been argued a few years before and so decided. I do not say Dr. Keen knew this, but such was the fact.

The dog, of course, was refused, when Dr. Keen immediately rushed into print to call down public vengeance on humane societies in general and Mrs. White in particular, and for a few days the *contretemps* was the talk of the town.

Mrs. White logically and successfully defended herself. And I think the feeling, even of the profession, was that Dr. Keen was not exactly candid in his conduct; that he was premature and exhibited offensive personal animus; I remember having heard at the time a brother professor in Jefferson College somewhat inelegantly say of him: "He went into the street and made a public attack on a reputable woman, and she licked him."

I am particular to give the facts in this celebrated case, because there has been an attempt in connection with it to cast reflections upon the candor, judgment, and personnel of the society of which I am president.

This is my excuse on this occasion, the first time I have ever attempted to do anything but treat with absolute silence and often even respect the uncomplimentary conduct of our opponents, because I know that with the very best intentions we can not always see things in the same light.

I beg the committee to examine the words of Dr. Keen in this particular, as he seems to imply that even the limited prohibition indicated by the refusal of a humane society to give the animals under its protection into the care of the champion of unlimited vivisection for experimentation, is to be condemned.

Now, I ask you gentlemen, is it possible for prejudice to lead a man into a conclusion more illogical?

Remember that in Philadelphia there is an average of over 6,000 vagrant dogs taken up every year and put to painless death. One year there was nearly 11,000, so that it is almost possible at any time to find a dog on the street that would be better off dead than alive, and yet Dr. Keen wrote to the president of a humane society—not permitted to do such a thing—to send him a dog as material for an experiment! If he had only been interested in benefiting the man, some uncharitably said, might he not have sent the janitor of the college to the garbage barrel at the back gate, where he would likely have found a dog to his purpose? But no; sweet are the uses of advertisement, and here was an opportunity.

"It was only an attempted *coup de main* that if successful would have won for its projector credit and cast discredit on the antivivisection society; that it was a failure seems not to have been his fault."

The concluding words of Dr. Keen's rehearsal of this occurrence,

evidently intended to cast reflection upon the judgment and purposes of antivivisectors, may also be objected to as calculated to give a false impression, and that, too, because of Dr. Keen's evident misapprehension of the aims of antivivisectors.

I don't believe there is an antivivisector in the world who would refuse to allow Dr. Keen, under the circumstances he mentions, to do what he wanted to do with that dog. If animals were put under an anæsthetic, as this one was to have been, and killed before restored to consciousness, vivisectors might do to them during the interim whatever they pleased, and no antivivisector would object. Mrs. White did not object because she was an antivivisector, but because she was not allowed to give up for experimentation any animal under her protection.

If vivisectors could show us that this was always done, the antivivisection societies of the world would cease to exist. Dr. Gallinger's bill that we are advocating permits much greater liberties in the matter of vivisection than this.

It is the nameless torture, and prolonged, without the friendly aid of an anæsthetic, that makes the antivivisection societies of the world necessary.

In conclusion, Dr. Keen's overconfiding expression of faith in his own toploftiness might also be received *cum grano salis*.

"My position," he preposterously claims, "is that of an expert whose testimony can scarcely be impeached!"

Specialism in medicine has become so much of a fetich in recent years that it is no wonder we occasionally encounter a specialist who takes himself too seriously.

Nothing surely but this self-centered fetich worship can account for such an abnormal state of egotism in an otherwise sensible and modest man as this indicated by Dr. Keen's exaggerated claim of infallibility.

We have shown that men of the loftiest character and greatest reputation in the profession disagree with him in his utterances about the utility of vivisection, and yet he says that "*his* position is that of an expert whose testimony can scarcely be impeached!"

There are a dozen surgeons in Philadelphia at least as good as the professor of surgery in Jefferson Medical College, and we esteem Dr. Keen as a conscientious surgeon, but with fantastic views about the utility of vivisection. Every city in the Union has its surgeons of whom their friends are proud, men who deservedly exercise a proper authority in things surgical. We esteem and respect them. We call them in in consultation, sympathize in their failures, and rejoice in their friendship and their successes; but none of them, it would seem, are Sir Oracles but Dr. Keen!

We have no desire to underrate the invaluable service of the surgeon when we say that to a great extent his art is a mechanic one, not essentially requiring the possession of the more exalted qualities for its perfection, and that it is often because of the obtuseness of the public, incapable of appreciating his finer work as a physician, that his surgery becomes so conspicuous. The man who cuts off a leg is more talked about by a wonder-loving laity than the man who saves it; but when a surgeon allows himself to be carried to an Olympia of fictitious glory by this ignorant adulation he at least lays himself open to criticism. He should bear his blushing honors with more becoming modesty and not imagine himself a surgical Pope.

In the name of suffering animals, outrages upon whose rights I have

ever attempted to diminish, I think I have shown that Dr. Keen's testimony is not altogether impeccable, and that, too, without intending to cast reflections upon his integrity as a man or his skill as a surgeon. Points of view must necessarily differ, but whether I have succeeded or not there is one thing certain—this question of vivisection is not one of utility, but of right and wrong.

According to pure abstract morality we have no right to inflict suffering on others that we ourselves may be benefited, and if not now, the time I believe must come—if the race is to be saved from again lapsing into a barbarity worse than that from which it sprang—when living, suffering, sentient creatures *will be* protected from the vivisector's knife.

THE ADVANCEMENT OF MEDICINE BY RESEARCH.[1]

By HENRY P. BOWDITCH, M. D., *of Boston.*

[Discourse delivered at the annual meeting of the Massachusetts Medical Society, June 10, 1896.]

Mr. President and Fellows of the Massachusetts Medical Society: The recent attempt by the Society for the Prevention of Cruelty to Animals to secure legislation for the restriction of biological research in Massachusetts and the probability[1] that the attempt will be repeated during the next session of the legislature may serve as my excuse for asking you to consider the history and significance of the movement, the inevitable result of its success, as well as the moral principles which here find their application.

That the legislature of Massachusetts should be requested to restrict the right of physicians to study their profession, and of the higher educational institutions of the State to teach the sciences on which the practice of medicine rests, is a phenomenon which surprises no one who has watched the progress of the so-called "antivivisection" agitation during the last quarter of a century. At various times within this period have the efforts of misguided benevolence been directed to checking the progress of medical science by interfering with one of the most important methods by which advances can be made. Fortunately for humanity, these efforts have, in nearly all cases, been rendered futile by the sound common sense of the community. In England alone, of all civilized countries, has a certain amount of success crowned the efforts of fanatical agitators, and, by the enactment of a restrictive law, a serious blow has been inflicted upon English physiology.

In the presence of such an agitation it is of course to the members of the medical profession that the community, distressed by the constant repetition of tales of imaginary atrocities, will naturally turn for the assurance that teachers of the medical sciences are not brutes and criminals, and that medical students are not young ruffians who delight in blood and suffering. It is therefore important that physicians should be at all times ready to explain to the laity how, as Dr. J. G. Curtis has happily expressed it, "in the slowly woven fabric of achievement pure science and applied science, biology, and medicine have always been warp and woof."

It requires no professional training to comprehend that a knowledge

[1] Reference notes will be found at the end of this paper.

of the bodily functions in their normal state is essential for the understanding and treatment of those derangements of function which constitute disease and that physiology, which deals with these normal functions, must therefore form the basis upon which medical science and medical practice alike must rest. Now, nearly all the phenomena of life which form the subject-matter of physiology are either physical or chemical in their character. In fact, physiology must be regarded as the physics and chemistry of living bodies. Therefore, just as the physicist and the chemist build upon the basis of experiment the solid superstructure of their sciences, so the physiologist can hope to advance firmly and successfully to the discovery of the laws of life only on the condition that the same experimental method supplies the stepping stones for his progress.

Self-evident as this proposition seems to the student of nature's laws, certain persons are ready to deny the legitimacy of the experimental method of research when applied to living bodies, while they admit it to be absolutely indispensable in the case of nonliving matter. The cause of this attitude of mind is not difficult to discover. In fact, it has its origin in the noblest feelings of human nature, in the sentiment that bids us be merciful as we would obtain mercy. Those who hold these views, profoundly impressed by what they conceive to be the painful nature of experiments performed on living animals and by the alleged indifference to animal suffering shown by the experimenters, have not hesitated to bring charges of cruelty against those who are engaged in seeking to penetrate the mystery which still surrounds the actions and reactions of living organisms, and thus to lay, broad and deep, the foundations on which the medical science of the future is to be built up.[2]

I have used the words "misguided benevolence" in speaking of this agitation, and there is no doubt that many, though unfortunately not all, of the persons engaged in this crusade are benevolent in their disposition and conscientious in their attitude, but it should be remembered that, as Mr. Roosevelt recently remarked, "Conscience without common sense may lead to folly, which is but the handmaiden of crime."

In judging of the moral and mental attitude of those who are engaged in this mischievous agitation it is important to distinguish carefully between the leaders and the followers. The former are, fortunately, very few in number, but by their activity and apparent ubiquity they easily create an impression of being a much larger force. Dominated by the single idea that vivisection is an "abominable thing and hateful in the sight of God," they presume to teach lessons of humanity to the members of a profession which exists for the relief of suffering. Unable to comprehend the reports of biological investigations published for professional readers, they recklessly denounce perfectly painless experiments as cases of fiendish torture.[3] Deliberate and authoritative statements setting forth the necessity of animal experimentation for the advancement of medical science, the vast amount of good already accomplished, and the comparatively trifling amount of the suffering involved are treated simply as falsehoods such as might naturally be expected from the "cowardly criminals" who practice vivisection.[4]

This movement is therefore by no means to be regarded as a simple humanitarian effort to reduce to a minimum the amount of animal

suffering connected with vivisection. Restrictive laws like that of England are denounced as useless, and the total abolition of the practice is imperatively demanded.[5] That this will have the effect of seriously checking the advance of medical science some of the leaders ignorantly deny, while others contemplate this result with satisfaction, for they deny the right of the human race to profit by animal suffering and condemn the saving of a human life by the sacrifice of that of a dog.

That this is not an exaggerated statement of the position assumed by antivivisectionists a single quotation from the writings of Henry Bergh will suffice to show. Mr. Bergh was for many years president of the New York Society for the Prevention of Cruelty to Animals, and was throughout his life the acknowledged leader of the antivivisectionists in America. In a lecture[6] on this subject, delivered in 1880, occurs the following passage: "As another proof of the profane extremes to which these dissectors of living animals will go, Robert McDonald, M. D., on being questioned, declared that he had opened the veins of a dying person, remember, and had injected the blood of an animal into them many times, and had met with brilliant success. In other words, this potentate has discovered the means of thwarting the decrees of Providence, where a person was dying, and snatching away from its Maker a soul which He had called away from earth!" It seems to me that this blasphemous denunciation of a physician for saving a human life needs absolutely no comment.

It might naturally be supposed that such extravagances of statement would carry their own refutation, and would demand no more attention from serious people than the utterances of those medical philosophers who deny the utility of vaccination. Acting upon this supposition, and unmindful of the fact that lies travel faster than truth, biological investigators have, as a rule, not thought it necessary to contradict specifically the various misstatements which have been published with regard to their work. The result has been that certain excellent people, of emotional dispositions and without the special training which would enable them to judge correctly of such a question, have been led to believe that so much smoke must indicate some fire. They have, therefore, by joining antivivisection societies, lent the weight of their names and their purses to a movement fraught with danger to the welfare of the State. That members of our own profession have occasionally expressed themselves in such a way as to encourage this agitation is to be deplored, but not wondered at, for no one listens more sympathetically to a tale of suffering than a true, tender-hearted physician; and if he does not happen to be in a position to condradict, from his own knowledge, the heart-rending stories which are poured into his ears he may be readily convinced of the existence of abuses requiring legislative interference.

Recognizing the true nature of the antivivisection agitation, it is evident that educated physicians would be false to their high calling did they not resist with all their energy the attacks of an enemy whose success would destroy all hope of establishing medicine in the position to which it is rightfully entitled—that of the most important branch of biological science.

In thus maintaining their right to study and teach their profession physicians are not called upon to maintain that unnecessary pain has

never in the history of the world been inflicted in connection with vivisection. Their true contention should be—

(1) That the men in charge of the institutions where vivisections are practiced in this State are no less humane than those who desire to supervise their actions, while they are at the same time vastly better informed with regard to the importance of animal experimentation and the amount of suffering which it involves.

(2) That no abuse of the right to vivisect has been shown to exist in these institutions.

(3) That the governing bodies of these institutions possess both the will and the power to put a stop to such abuses should they arise.

(4) That the existing statutes furnish sufficient protection against cruelty in vivisection as well as against cruelty in general.

(5) That for the reasons above given legislation on this subject is wholly uncalled for.

These propositions define substantially the position assumed by this society in the resolution adopted four years ago in response to a communication from the Massachusetts Society for the Prevention of Cruelty to Animals[7], and with the medical profession united in their defense no fear need be felt that our legislature will ever yield to the pressure of fanatical agitation to the detriment of the best interests of the community.

A full account of the origin and progress of the antivivisection agitation would, of course, be impossible within the limits of this discourse, but it will be well to refer briefly to the history of the movement in other communities, calling attention to certain points which are full of instruction and warning for ourselves.

The first serious attack upon biological research in England seems to have been made in an essay entitled "Vivisection: Is it necessary or justifiable?" published in London in 1864 by George Fleming, a British army veterinary surgeon. This essay is an important one, for though characterized at the time by a reviewer in the London Atheneum as "ignorant, fallacious, and altogether unworthy of acceptance,"[8] its blood-curdling stories, applied to all sorts of institutions, have formed a large part of the stock in trade of subsequent antivivisection writers.

A fresh stimulus to the agitation was given by the publication in 1871 of a work edited by Prof. J. Burdon Sanderson, entitled "Handbook for the Physiological Laboratory." This book was intended to be used by students of physiology under the guidance of their instructors, and contained a description of the experimental basis on which modern physiology rests. Unfortunately, however, it fell into the hands of excitable men and women, who were ignorant of many things which had properly been taken for granted in writing for members of the medical profession. That anæsthetics, for instance, would be used in all cases to which they are applicable was tacitly assumed, just as it would be in a work on operative surgery. In consequence of this failure to comprehend the object for which the book was written, many well-meaning but too impulsive people jumped "to the conclusion that raw medical students were being encouraged to repeat for their pleasure every experiment that had ever yielded results, careless whether the subjects were conscious or unconscious of pain."

This misconception tended to produce an excited state of popular

feeling, which was intensified by the performance at the meeting of the British Medical Society in 1874 of some experiments on dogs, showing the difference between alcohol and absinthe in their physiological action. The excitement culminated in the appointment of a royal commission to inquire into the subject. The result of the investigation was a report which can not be better described than in the language of Lord Sherbrooke (better known as the Right Honorable Robert Lowe).[9] "The commission entirely acquitted English physiologists of the charge of cruelty. They pronounced a well-merited eulogium on the humanity of the medical profession in England. They pointed out that medical students were extremely sensitive to the infliction of pain upon animals, and that the feeling of the public at large was penetrated by the same sentiment. * * *

"They then proceeded to consider to what restrictions they should subject the humane and excellent persons in whose favor they had so decidedly reported. Their proceeding was very singular. They acquitted the accused and sentenced them to be under the surveillance of the police for life." Remarkable as was this conclusion of the commission, the action of Parliament based upon it was still more extraordinary, for a law was enacted which, taken in connection with the previous legislation, has brought about a state of things in England which has been well described as one "in which it is penal to use domestic animals in any way cruelly, but in which anyone may torture wild creatures in whatever fashion he likes, *provided it is not for scientific purposes.*"

The amount of mischief which may be produced by this English law depends very much upon the good judgment of the home secretary, to whom its enforcement is intrusted. The most eminent members of the medical profession in England have at times been refused a license to perform experiments which they declared to be of the greatest importance for medical science;[10] and, in general, it may be said that the system of licensing and government inspection under which biological research work must be conducted is, under the most favorable conditions, a source of serious annoyance to investigators, while it does not secure any better guaranty for the humane treatment of animals than is afforded by the character of the men engaged in the work.

The system, moreover, fails entirely to satisfy the antivivisectionists who, in support of their demand for a prohibitory law, continually circulate the most exaggerated and perverted accounts of experiments performed in licensed and inspected laboratories.[11]

The first outbreak of the antivivisection agitation in this country occurred in New York some fifteen or sixteen years ago,[12] when the State Society for the Prevention of Cruelty to Animals, under the leadership of Henry Bergh, attempted to secure the passage of a law prohibiting the practice of vivisection. The agitation was conducted with so much fanaticism, and the method of garbled quotation employed by Mr. Bergh was exposed so effectively by the late Dr. J. C. Dalton,[13] that the legislature not only declined to enact any restrictive laws, but maintained in full force an amendment to the general law against cruelty to animals adopted in 1867, providing that "nothing in this act contained shall be construed to prohibit or interfere with any properly conducted scientific experiments or investigations, which experiments shall be performed only under the authority of the faculty of some

regularly incorporated medical college or university of the State of New York."

New York has thus set an excellent example to her sister States in protecting her men of science in their attempts to enlarge the bounds of human knowledge from the vexatious interference of persons who can know nothing of the importance of the work or of the amount of suffering which it involves.

In Pennsylvania, also, attempts to secure restrictive legislation have been made by the American Antivivisection Society, which has its headquarters in Philadelphia; but the energetic protests of the medical profession have sufficed to render these attempts abortive.

In Washington, during the present session of Congress, the efforts of the local humane societies have been so far successful that the Committee on the District of Columbia has brought before the Senate a bill providing for the licensing and restricting of vivisection,[14] but there seems to be little reason to fear that such a bill will become a law.

In Massachusetts, the State Society for the Prevention of Cruelty to Animals has, until quite recently, treated this question with moderation and good sense. While regretting the necessity for sacrificing animal life for the advancement of science, and anxious, like all right-minded people, to reduce the sufferings of such animals to a minimum, it has not seen in the existing state of things any reason for demanding additional legislation or for taking any action under laws already in force. A few years ago the president of the society publicly called attention[15] to the failure of the antivivisection agitation, both in this country and in Europe, to effect any reduction in the number of animals subjected to experiment, and maintained that the proper attitude of the society should be one of cooperation with the best men of the medical profession in seeking to prevent any abuses from arising in connection with the practice of vivisection. To the friends of the society who rejoice in the good work it has been able to accomplish in the community, it must be a matter for sincere regret that this wise policy has been abandoned and that the society now finds itself arrayed in opposition not only to the medical profession but also to the higher educational institutions of the Commonwealth.[16] It is, however, but just to state that this position seems to have been assumed without any formal action by the governing body of the society.[17]

The bill first presented by the society to the legislature of 1896 provided that no painful experiments upon living animals should be performed in any educational institution of the State, except under the authority of the State board of health, and that the Massachusetts Society for the Prevention of Cruelty to Animals might supervise all such experiments. Violations of the law were to be punished by fines which, when collected, were to be turned over to the society.

During the hearings before the judiciary committee of the house this bill was twice modified, first by the omission of the section relating to the State board of health, and of the clause requiring the fines to be paid into the treasury of the society, and subsequently by providing that the agents of the society employed to supervise vivisections should be doctors of medicine.[18] The petitioners for this legislation were, one after another, compelled to acknowledge under cross-examination, that they were unable to present any evidence of cruelty practiced in the educational institutions of Massachusetts in connection with vivisection,

while the remonstrants, by a straightforward account of what actually occurs in physiological laboratories and by an exposure of exaggerations and misstatements with which antivivisectionist literature abounds, sought to convince the committee of the mischievous character of the agitation and of the unfortunate results which would necessarily follow the proposed legislation. Shortly after the close of the hearings the committee presented a unanimous report recommending "that the petitioners have leave to withdraw."

Having thus called your attention to a few salient points in the history of the antivivisection movement, and indicated the methods employed by the leaders of this crusade against the work of a profession whose glory is to save, let me next ask you to consider the reasons which not only justify students of medical science in resorting to experiments upon living animals, but require them to do so as a necessary condition of any important advance. In dealing with this question I shall make free use of a work entitled "Physiological Cruelty; or Fact *v.* Fancy, by Philanthropos." This book, which appeared in 1883, contains by far the most comprehensive, logical, and dispassionate discussion of the subject with which I am acquainted.

The vivisection question reduced to its simplest expression may be stated as follows: "Have we a right to give pain to animals in order to study the phenomena of life?" In answering this question we perceive at once the necessity of a clear conception of what pain really is, and in striving to obtain this conception we are struck by the fact that pain is a purely subjective phenomenon. We *know* absolutely nothing about pain except that which we have ourselves suffered. We infer, of course, when we hear another person describe a painful sensation, that his feelings are similar in a general way to those which we imagine we ourselves should experience under like circumstances. This assumption of similarity of sensation is justified by the facts of our common human nature; but we are often struck, when listening to such descriptions, by the apparent difference between the impressions produced upon different individuals by the same external cause. A trifling surgical operation, which will not be considered worth mentioning by one individual, will, to another, be apparently the source of most acute suffering. We are thus led to suspect that, even in the circle of our own acquaintances, there must be quite a wide range of sensibility to pain.

If we extend our observation over a wider field, we find reason to believe that in the human race there is a certain rough proportionality between sensibility to pain and intellectual development. A case is recorded, for instance, of a Russian serf who, while splitting logs in a forest, was caught by the thumb in the crack of a large log from which the wedge had unexpectedly flown out. He tore himself free from his painful imprisonment, as a wild animal might have done, leaving the thumb in the log, with the long tendons of the forearm still attached to it. It is doubtful if a more civilized man could have subjected himself to this operation even with the alternative before him of an indefinite imprisonment in the forest. The cruel tortures which savages inflict upon their friends and themselves, as in the initiation rites of the Mandan warriors,[19] seem to be best explained on the supposition that their sensibility to pain is less acute than that of civilized races.

In the case of the lower animals the evidence of a low sensibility to *pain* is much more conclusive. Among our domestic animals the horse

and dog are commonly regarded as standing nearest to man in intelligence and sensibility, and yet nearly everyone who has had much to do with these animals will recall instances of great indifference shown by them to what would be to us severe pain. A single illustration of this insensibility may suffice. A horse whose leg was badly broken was sentenced to be shot, but during the two hours which intervened between the sentence and the execution the animal limped about to graze, dragging the fractured limb dangling behind it in a way which would have caused a human being exquisite agony. It is evident, therefore, that it is entirely impossible to draw conclusions with regard to the sensations of animals by an effort to imagine what our own would be under similiar circumstances.

Our common human nature, which serves as a guide, though an imperfect one, in estimating the sufferings of other human beings, fails us entirely when we have to do with animals, and we are left to draw conclusions from cries, motions, and other external signs of suffering. Now, these external signs are apt to be misleading, for they only prove "that something is going on which the organism repels," but do not prove that the animal is conscious of what is going on. In other words, the cries and struggles of an animal whose skin is cut or burned belong to that class of phenomena known as "reflex actions," i. e.—they are movements having their origin in impressions made on the terminations of the nerves, and not in impulses coming from the nerve centers in the brain. They may be accompanied by consciousness, but consciousness, so far from being necessary for their production, acts rather to check and interfere with their manifestation.

We are all perfectly well aware that when the spinal cord of an animal has been divided in the cervical region, an impression made upon the nerves of the skin, either by a sharp instrument or a chemical irritant, will cause the animal to execute violent movements of very definite character, adapted to remove the source of irritation and differing in no respect, except perhaps in increased energy, from the movements of a perfectly uninjured animal. But in this case we know that the movements are not attended by consciousness, for by division of the spinal cord the channel by which impressions are conveyed to the nerve centers, whose activity is a necessary condition of consciousness, is entirely obliterated. The movements are, in fact, no more indicative of suffering than are the convulsive flutterings of a decapitated chicken. We can speak with great positiveness upon this point, for the testimony of hospital patients suffering from injuries to the spinal cord shows clearly that violent reflex movements of the lower limbs may occur absolutely unattended by consciousness. It is, moreover, a matter of common experience that in certain stages of anæsthesia consciousness may be entirely abolished, while the activity of the lower reflex centers remains unaffected. In such cases patients may struggle and scream during an operation, but subsequently declare they have suffered no pain.

It is evident, therefore, that great caution must be exercised in drawing conclusions with regard to the sensations of animals from the external signs of suffering which they manifest when undergoing operations, and that the "spasm of agony" of sensational writers is in most cases much better described as a nerve-muscle reaction.

We have thus seen that for the production of a painful sensation three things are necessary:

First, the stimulation of a sensory nerve or its terminations.

Second, the transmission of the stimulus to the nerve centers whose activity is associated with consciousness.

Third, the response of these nerve centers to the stimulus thus received.

Pain may then be defined as the *consciousness of the excessive stimulation of a sensory nerve.* This definition excludes those cases in which the brain is narcotized or separated from the rest of the nervous system so that there can be no consciousness of the stimulation of the nerve, however severe it may be, and also those cases where the stimulation of the nerve is moderate in amount and therefore gives rise to agreeable sensations. The precise point where the stimulus of a nerve ceases to be moderate and agreeable and becomes excessive and painful can not be determined with precision, for a stimulation which is moderate for one individual will be excessive for another, or for the same individual at a different time. The strong alcoholic liquor, for instance, which pleasantly titillates the throat of the drunkard will sear the delicate mucous membrane of the child unaccustomed to its use.

Having thus arrived at a definition of pain and noted that the phenomenon in man and the lower animals is similar in kind, though vastly different in degree, we recur to the original question: Have we a right, in studying the phenomena of life, to inflict upon animals whatever pain may be necessary for the attainment of our object? This leads us to consider the broader question, how far it is right that one individual should suffer for the good of another, and this again involves the still broader problem, how far the prospect of future good may compensate for present evil. A full discussion of these questions would carry us far beyond the limits of this discourse. For our present purpose it will be sufficient to note the fact that we unhesitatingly submit ourselves and subject those we love to physical suffering for the sake of future benefit which we think will outweigh the present pain. Nor is this deliberate choice of present evil for the sake of future good limited to those cases in which the evil and the good are both experienced by the same individual.

The law of vicarious suffering, by which pain to one individual secures pleasure to another, is a law from whose operation we can not escape if we would, and, however much we may at times rebel against it, a calm consideration forces us to recognize its stern beneficence. The law which bids us bear one another's burdens, and that which declares that the sins of the fathers shall be visited upon the children, tend powerfully to bind the human race together and contribute perhaps more than any other causes to the development of the moral sense. We see, then, that there is nothing repugnant to our moral feelings in the abstract idea that one individual should suffer for the benefit of another, and we accept this principle, as indeed we *must*, when applied to two individuals belonging to the highest grade of sentient creatures, there is still less reason for rejecting it when the suffering individual belongs to a lower grade than the individual who is benefited, since, for the reasons already given, the suffering, in this case, bears a smaller proportion to the benefits obtained than when both individuals are equally highly organized. Moreover, when the sufferings of the lower animals have as a result not a benefit to a

single individual, but an increase of human knowledge, the disproportion between the suffering and the benefit becomes practically infinite, for the suffering remains a constant quantity, while the benefit, since it accrues to the whole human race and through all time, is multiplied by an infinite factor.

Admitting, then, that there is no abstract reason why animals should not suffer for the benefit of man, it remains to be considered whether we have a "right to constitute ourselves administrators of this law of vicarious suffering and to apply it to animals for our own interest." The right of man to inflict pain upon the lower animals for his own benefit has never been very distinctly formulated. Our relations to the wild denizens of the forest, field, and stream are very largely an inheritance from those times when our savage ancestors disputed with the lower animals for the right to exist on the face of the earth. In fact they do not differ materially, except in degree of complication, from the relation of the lion to the lamb or the hawk to the dove.

In the words of the author of the above-mentioned work on Physiological Cruelty, "It is generally admitted that we may chase and kill an animal, often necessarily with much pain, not because its life and liberty interfere with ours, but because its death will render our life more complete, perhaps in the most trivial detail. We kill them (without anæsthetics) not only that we may have food and clothing, but that the food may be varied and attractive and the clothing rich and beautiful. We subject them to painful mutilations in order to make them more manageable for service, to improve the flavor of their flesh, and even to please our whimsical fancies. We imprison them in cages and zoological gardens to improve our knowledge of natural history, or merely to amuse ourselves by looking at them. It is abundantly clear that in all our customary dealings with animals we apply to them without scruple the law of sacrifice, and interpret it with a wide latitude in our own favor. * * * So far, the general principle of dealing with animals which is in a vague way accepted by most humane persons * * * seems to be that we may kill, inconvenience, or pain them for any benefit, convenience, or pleasure to ourselves, but that the pain must be within moderate limits (of course undefined), and that it must form no element in our pleasure."

Now the point to be specially emphasized in this connection is that physiologists, in experimenting with living organisms, cause an amount of suffering utterly insignificant compared with that which animals are called upon to endure in other ways, and that the suffering thus caused is inflicted with a motive and with an expectation of benefit quite adequate to justify the infliction of a much greater amount of pain that even the most serious operations in the laboratory can be supposed to produce.

In this respect the physiologist stands, it seems to me, on higher moral ground than that occupied by most persons whose occupation leads them to sacrifice animal life. Compare, for instance, the occupation of a sportsman with that of a physiologist. It is difficult to imagine how an animal, such as a deer or a rabbit, can be made to endure greater physical agony than in being hunted to death by hounds. It is hard to conceive of animal suffering more entirely out of proportion to the object sought and gained by it than that produced by the average sportsman whenever he fires a charge of shot into a

flock of birds, since for every bird actually killed several more will probably be wounded, and, escaping with broken wings, fall an easy prey to their enemies or perish from starvation.

Yet we inflict this suffering, not because we need the animal for food, not because its existence interferes in any way with our own, not because we expect to derive any permanent benefit from its destruction, but simply, as the word "sport" implies, because we are in search of amusement and the sufferings of the animal are incidentally associated with our enjoyment of the moment. It must not be supposed that I desire to bring the charge of cruelty against sportsmen, for, of course, the fact that the animal suffers pain forms no part of the pleasure of the hunter; nor do I overlook the great benefit which the sportsman derives incidentally from his pursuit in the acquirement of health, strength, and skill. I merely wish to point out, first, that, as far as the charge of cruelty is concerned, the physiologist may claim the same exemption which is accorded to the sportsman, for, so far from enjoying the sufferings of the animals on which he experiments, it is his constant object to reduce those sufferings to a minimum; and secondly, that, with regard to a justification for the infliction of pain, the advantage is on the side of the physiologist, for the desire to enlarge the bounds of human knowledge and to fix firmly the foundations of the healing art must be regarded as a higher motive than the wish to secure one's own temporary amusement, and moreover, the proportion between the benefit obtained and the pain inflicted is much larger in physiological experimentation than in the vocation of the sportsman.

In this connection it is interesting to contrast the fate of the victims of science with that of similar animals living in a state of nature. In doing this we are struck by the vast amount of animal suffering which the laws of nature necessitate. The weak are inevitably the victims of the strong. The chain of destruction extends throughout the animal creation, and every link involves the death of victims under circumstances which, from a human point of view, seem those of revolting cruelty. The cat plays with the mouse, apparently enjoying its terror and distress. The butcher bird impales its living victims on the thorns of the locust tree, thus laying up in its hideous larder a store of food often far beyond its needs. The larger carnivora tear their living prey limb from limb. In fact the relations of animals to each other are such as to fully justify, from a moral standpoint, an indictment for cruelty against nature herself.

With regard to domestic animals the case is often not much better. The vagrant cur and the prowling cat lead a life of constant terror, eking out a miserable existence amongst piles of garbage, and dying finally, when physical strength fails, from sheer starvation. Compared with misery like this the fate of the chosen victim of science may well be regarded as enviable, for once within the laboratory precincts warmth and abundant food are assured, and, though the term of life is shortened, its closing scene is often absolutely painless, and is, in any case, likely to be attended with less suffering than a so-called natural death.

With regard to physiological experiments which involve operations of a painful nature upon living animals, it is desirable for us to ascertain as accurately as possible the amount of suffering thus caused. The first important fact to be here noted is that the great boon con-

ferred upon mankind in the discovery of anæsthetics extends its beneficent influence over the animal world as well. Just as no modern surgeon ever thinks of performing a severe surgical operation without placing the patient under the influence of ether or chloroform, so no physiologist neglects to use an anæsthetic when performing a prolonged or painful experiment except in those rare cases in which its administration would interfere with the result of the experiment.

Even on the supposition, which too many sensational writers are prone to make, that a physiologist is absolutely regardless of the amount of suffering which he causes, he will still be compelled to use an anæsthetic for his own convenience in order to suppress the cries and struggles of the animal, which would otherwise disturb the adjustment of his delicate intsruments and interfere with the mental concentration essential for the proper performance of his work. This very concentration of the mind upon the work in hand prevents, of course, any active feeling of sympathy with the animal experimented upon, but the same may be said of the surgeon who, however tender-hearted he may be, never in operating allows his mind to wander from the work in which his hands are engaged. Neither the one nor the other can be charged with cruelty or inhumanity.

In this connection it may be well to allude to the question whether curare, a drug much used by physiologists, is or is not an anæsthetic. This substance is the arrow poison of certain tribes of South American Indians, and has the property of paralyzing the voluntary muscles. The earlier experiments of Claude Bernard on frogs, showing that sensory nerves are not affected by the poison, led him to the conclusion that an animal poisoned by curare preserves his sensibility to pain, but has lost the power of giving any sign of suffering. Strictly speaking, Bernard's experiments only show that the drug affects the sensory nerves and the spinal cord less readily than the motor nerves, while they throw no light on the question of the persistence of consciousness, but the fact that they succeed equally well after the removal of the cerebral lobes seems to exclude consciousness from any important participation in the phenomena.

The arguments which have sometimes been used to sustain the proposition that curare increases the sensibility to pain would prove also that small doses of morphia have the same effect, whereas we know that morphia in small doses diminishes and in larger doses annihilates the sensibility to pain. Thus the weight of physiological evidence seems to be in favor of the view that curare may be to some extent an anæsthetic, though it is not employed by physiologists for that purpose. Psychological evidence pointing in the same direction may also be urged, for, on the theory promulgated and ably defended by Prof. William James, that all emotions are but the conscious recognition of the reflex actions produced by the exciting cause of the emotions, it seems evident that so much of the substratum of the feeling of pain as is dependent upon the reflex contraction of voluntary muscles must, in cases of curare poisoning, be absolutely wanting.[20]

Of the possibly painful physiological experiments which we are now considering, it has been calculated by Professor Yeo that 75 per cent are rendered absolutely painless by the use of anæsthetics; but it must be admitted that the giving of an anæsthetic to an animal is not the same agreeable operation that it is to a human being. The animal does not understand the reason why it is compelled to breathe a vapor

which is gradually depriving it of its consciousness, and usually struggles against the administration of it, thus rendering some sort of forcible confinement necessary. The inconvenience thus occasioned to the animal is, of course, overbalanced in the case of prolonged or serious operations by the exemption from subsequent suffering. When, however, the operation is of a trifling character it is doubtless more merciful to the animal to dispense with the use of anæsthetics.

For the complete understanding of this portion of the subject it should be mentioned that a large portion of the animals thus rendered insensible for physiological purposes are killed after the experiment has been performed and before the effect of the anæsthetic has passed off. Where the object of the research is to observe the subsequent effect of the operation, it is, of course, necessary to allow the animal to recover from the anæsthetic and to endure whatever pain may be connected with the healing of its wounds. This has, however, been reduced to insignificance by the modern methods of antiseptic surgery, the discovery of which was led up to by physiological experiments, and the benefits of which are now experienced by the brute creation as well as by the human race.

Accepting Professor Yeo's estimate that 75 per cent of the possibly painful physiological experiments are rendered absolutely painless by the use of anæsthetics, it remains to be considered how much suffering attends the remaining 25 per cent of these experiments; and here it is important, in all discussions of this subject, to correct a rather prevalent popular notion that a wound is painful in proportion to its depth. The fact is, however, that sensibility to pain is, in a healthy body, confined almost wholly to the surface. A consideration of the function of the sensory nerves shows us why this should be the case, for these nerves are distributed only to points where, under normal circumstances, they can receive stimulation, and thus serve to bring the organism into relation with the outer world.

Pain, caused by excessive stimulation of a sensory nerve, is the sign that the intregrity of the body is threatened by some external agency, and at this signal the body reacts consciously or unconsciously to ward off the threatened danger. Now, external agencies can act upon the body only at the surface. Hence, sensory nerves distributed to internal organs would have no raison d'être; and, in the wise economy of nature, we find, accordingly, that they do not exist. The apparent contradiction to this statement, furnished by the painful sensations, e.g. cramps and colics, which we sometimes experience in our internal organs, are really illustrations of the same general law, for the pain in this case is the indication of some morbid action of an organ, and is usually the sign that rest is necessary to enable the organ to recover its normal condition.

It is a matter of common experience therefore that the cutting of the skin is the only really painful part of even quite serious operations. As the knife divides the deeper organs no pain is felt, except indeed when the sensory nerve trunk is divided, which operation is attended by a momentary flash of pain. Even the brain, the seat of consciousness itself, is no exception to this rule, for its substance may be cut and operated on in various ways without causing the slightest pain. It is evident therefore that in a large proportion of the actually painful experiments performed in physiological laboratories the pain must be of the briefest duration, since it is almost

wholly confined to the preliminary incision. It must also be borne in mind that a large class of experiments consists in the introduction of drugs under the skin, an operation about as painful as vaccination or as a subcutaneous injection of morphia. Bearing these facts in mind, we are well prepared to accept Professor Yeo's estimate, and that of the 25 per cent of actually painful experiments 20 per cent are about as painful as vaccination, 4 per cent about as painful as the healing of a wound, and 1 per cent as painful as an ordinary surgical operation performed without anæsthetics.[21]

I have thus sought to set before you the material for forming a judgment with regard to the amount of animal suffering which the practice of experimental physiology involves. It remains for me now to speak of the value of the discoveries thus made, or, in other words, to present to you briefly the evidence of the debt owed by the practicing physician of the present day to the physiologists of the past. We shall then be in a position to answer the question whether on the whole "vivisection pays." To enumerate all the discoveries that have been made in physiology by means of experiments on animals would be utterly impossible within the limits of this discourse, for there is hardly a single organ of the human body whose functions have not been investigated and explained in this way. It will suffice at this time to call your attention to a few of the more important physiological discoveries which form the groundwork of our knowledge of the human body and to ask you to imagine, if you can, what would be the condition of the healing art if these discoveries had never been made.

To begin with, let us consider the circulation of the blood, the discovery of which bears somewhat the same relation to medicine that that of the law of gravitation bears to physics. It is well known that the ancients believed the arteries, as their name implies, to be tubes containing air. When Galen, in the second century of our era, studied the arteries on living animals, the fact that they carry blood was of course apparent. The circulation of the blood was, however, far from being made out. In fact it was not till the beginning of the seventeenth century that Harvey, gathering up the learning of the time, contributed by the great Italian teachers, Vesalius, Eustachius, Fallopius, Fabricius of Aquapendente, and others, and making important additions of his own (as he himself says) "by frequently looking into many and various living animals,"[22] was finally able to promulgate the true theory of the circulation of the blood.

Since the time of Harvey our knowledge of the conditions under which the blood circulates has been greatly extended, and always by means of experiments upon living animals. The pressure which the blood exerts upon the walls of the vessels in different parts of its course has been carefully measured. The fact that its white globules can pass through the vascular walls into the tissues outside has been clearly demonstrated, and forms, in fact, the basis of the modern theory of inflammation. The influence of the nervous system in controlling the size of the channels through which the blood circulates, thus regulating the nutrition of the tissues, the activity of the organs and the distribution of the heat, has been studied by a host of observers, and is, indeed, one of the most fruitful fields of modern physiological research. It is difficult to imagine what the practice of medicine would be without this knowledge, which has been wholly obtained by experiments on living animals, and which is now the common property of educated

physicians. It has, indeed, been very pertinently asked: "How will those earnest antivivisectionists, who, like Miss Cobbe, prefer to 'die sooner than profit by such foul rites,' provide themselves with a medical attendant warranted ignorant of the circulation of the blood?"

The direct benefits received from animal experimentation are perhaps more obvious in surgery than in the other departments of medicine. The proper mode of applying ligatures to arteries and the antiseptic treatment of wounds have reached their present stage of perfection largely through experiments on the lower animals. To give you a vivid idea of the privileges which we are now enjoying I will ask you to listen to Ambrose Paré's description of an amputation as performed in his time.[23]

"I observed my masters whose method I intended to follow, who thought themselves singularly well appointed to stanch a flux of blood when they were furnished with various store of hot irons and caustic medicines, which they would use to the dismembered part, now one, then another, as they themselves thought meet, which thing can not be spoken or but thought upon without great horror, much less acted. For this kind of remedy could not but bring great and tormenting pain to the patient, seeing such fresh wounds made in the quick and sound flesh are endured with exquisite sense. * * * And verily of such as were burnt the third part scarce ever recovered, and that with much ado, for that combust wounds with difficulty come to cicatrization; for by this burning are caused cruel pains, whence a fever, convulsion, and ofttimes other accidents worse than these. Add hereunto, that when the eschar fell away, ofttimes a new hæmorrhage ensued, for stanching whereof they were forced to use other caustic and burning instruments. * * * Through which occasion the bones were laid bare, whence many were forced for the remainder of their wretched life to carry about an ulcer on that part which was dismembered; which also took away the opportunity of fitting or putting to an artificial leg or arm instead of that which was taken off."

Let us now contrast this ghastly picture with the methods of a modern amputation. The patient is first made unconscious by the use of ether or chloroform. The blood vessels of the limbs are then emptied by means of an elastic bandage. Hardly a drop of blood is shed in the amputation itself, the divided arteries are firmly tied, and the wound, treated antiseptically, heals with little or no pain. At every step in the process which has led to this brilliant result experiment has been the guide. Various technical details of the method remain still to be worked out. It is this beneficent work which antivivisectionists seek to abolish.

I will allude to but one other benefit conferred upon suffering humanity by scientific experiments involving the sacrifice of animal life: The therapeutic use of antitoxin, though still in its infancy, shows by the unimpeachable records of hospital practice that the physician has now within his grasp the means of successfully treating one of our most dreaded diseases. The anxiety, almost amounting to despair, with which a physician formerly approached a serious case of diphtheria, has given place to a feeling of well-grounded hope of a favorable result. Who can estimate the burden of terror and distress thus removed from the anxious watchers by the bedside, and who will dare to say that the boon has been dearly purchased by the lives of some thousands of guinea pigs?[24]

Let us now briefly review the points over which we have already passed. We have seen, in the first place, that pain is a purely subjective phenomenon, the sensibility to which differs very much in different individuals and is in the lower animals reduced apparently much below that of the least sensitive human beings, and that, moreover, the external signs of suffering are apt to be misleading unless the conditions under which these signs are made are well understood, a knowledge which can be acquired only by careful physiological study. We have seen, in the second place, that pain is only relatively an evil, that we submit to it ourselves and subject others to it for the sake of subsequent advantages which we consider sufficiently important. Thirdly, we have seen that our relations to animals are such that there is no well-recognized objection to our causing them very great suffering for the sake of very slight benefits to ourselves. In this matter there is, of course, great room for improvement.

The practical question always is, "How much suffering may we inflict on an animal for the sake of how little benefit to ourselves?" In the progress of civilization there is a constant tendency to draw the line more and more in favor of the animal, but when we remember how much opposition was, within a few years, arrayed in this State against the passage of a law to abolish pigeon shooting we can not flatter ourselves that we have, as yet, reached any very advanced humanitarian standpoint. It is certainly no very extravagant concession to the rights of animals to enact that they shall not be set up as living targets at a shooting match when glass balls thrown into the air will answer the same purpose.

In forming and fostering a public opinion which demands a greater consideration for the brute creation the societies for the prevention of cruelty to animals have played an important part, and their work would doubtless be still more effective were they in the habit of making more frequent applications of the results of physiological research to the problems of animal life. By the efforts of these societies and by the general growth of humane sentiments in the community, we may expect that a larger and larger prospective benefit will be demanded as a justification for the infliction of pain upon animals. To this raising of the requirements of humanity physiologists will be certain to offer no objection, provided the same rule is applied to all occupations involving pain to animals; for it is evident, I trust, from what has been said, that a standard so high as to be practically inapplicable to the daily affairs of life will still leave a wide margin for the carrying on of physiological research.

A questionable practice can not, of course, be justified by demonstrating that another still less justifiable practice exists, but it may be fairly urged that while practices are permitted which cause great suffering to animals, with only incidental benefits to mankind, "it is irrational folly," to quote a writer in Nature, "to waste the energy of humanitarian feeling in a warfare against the only kind of pain-giving practice which is directed toward the mitigation of pain, and which has already been successful in this its object to a degree out of all proportion to the pain inflicted."

Enough has been said, I trust, to demonstrate the expediency of permitting physiological research to go on unchecked, and even of encouraging it in every possible way as the only legitimate basis of scientific medicine. Before leaving the subject, however, it is well to

notice that whatever restrictions be imposed on the physiologist working in his laboratory, the advancement of medicine by experiment will be certain to go on. Agitation can not check it. Legislation can not prevent it. Once admit, what no one thinks of disputing, that physiological phenomena are chemical or physical in their character, and the position of physiology among the experimental sciences is a matter of necessity. All that legal enactments can do is to determine to some extent who shall be the experimenters and who the victims of the experiments. Shall practicing physicians grope blindly in search of methods of treatment when chance brings disease under their observation, or shall men of science, systematically studying the nature and results of morbid processes in animals, point out to the practitioner the path to be followed to render innocuous the contagion of our most dreaded diseases? In illustration of this point permit me to quote a few lines from Dr. John Simon's address on State Medicine:[25]

"The experiments which give us our teaching with regard to the causes of disease are of two sorts: On the one hand we have the carefully prearranged and comparatively few experiments which are done by us in our pathological laboratories, and for the most part on other animals than man; on the other hand, we have the experiments which accident does for us, and above all the incalculably large amount of crude experiment which is popularly done by man on man under our present ordinary conditions of social life, and which gives us its results for our interpretation. * * * Let me illustrate my argument by showing you the two processes at work in identical provinces of subject-matter. What are the classical experiments to which we chiefly refer when we think of guarding against the dangers of Asiatic cholera? On the one side there are the well-known scientific infection experiments of Professor Thiersch, performed on a certain number of mice. On the other hand, there are the equally well-known popular experiments which during our two cholera epidemics of 1848–49 and 1853–54 were performed on half a million of human beings, dwelling in the southern districts of London, by certain commercial companies which supplied those districts with water.

"Both the professor and water companies gave us valuable experimental teaching as to the manner in which cholera is spread. * * * Now, assuming for the moment that man and brute are of exactly equal value, I would submit that, when the life of either man or brute is to be made merely instrumental to the establishment of a scientific truth, the use of the life should be economical. Let me, in that point of view, invite you to compare, or rather to contrast with one another, those two sorts of experiment from which we have to get our knowledge of the causes of disease. The commercial experiments which illustrated the dangerousness of sewage-polluted water supplies cost many thousands of human lives; the scientific experiments which, with infinitely more exactitude, justified a presumption of dangerousness cost the lives of fourteen mice."

We see, then, that in one way or another experiment must form the basis on which medical science is to be built up. The question for us to decide is, "Shall these experiments be few, carefully planned, conclusive, economical of animal life, or shall they be numerous, accidental, vague, and wasteful of human life?" I think in settling this question we may safely take for our guide the words of Him who *said, "Ye are of* more value than many sparrows."

APPENDIX TO DR. BOWDITCH'S DISCOURSE.

[1] [From "Our Dumb Animals," May, 1896.]

OUR BATTLE AT THE STATE HOUSE.—We have had three hearings before "the house judiciary committee," and large audiences, for a law intended to permit us to ascertain whether by cruel vivisection there is in any of our educational institutions any violation of the laws of Massachusetts enacted for the prevention of cruelty to animals.

* * * * * * *

After three hearings, and despite of all that we and our able attorney, James H. Bailey, jr., esq., have been able to do, we have been defeated, and until another session of the legislature we can have no legal right to witness in any of these colleges or schools the experiments performed on living animals.

* * * * * * *

Possibly another year Harvard University may decide to throw open its own doors and cease to oppose a law which will give us power to obtain information in regard to all the other educational institutions of our State.

(Signed) GEO. T. ANGELL.

[2] My attention has kindly been called to the following passage in Bacon's writings, showing that this great philosopher fully appreciated the importance of experiments upon animals as a foundation for medical science:

"In the inquiry which is made by anatomy I find much deficience: for they inquire of the parts, and their substance, figures, and collocations; but they inquire not of the diversities of the parts, the secrecies of the passages and the seats or nestling of the humours, nor much of the footsteps and impressions of diseases. * * * And for the passages and pores, it is true, which was anciently noted, that the more subtile of them appear not in anatomies, because they are shut and latent in dead bodies, though they be open and manifest in live: which being supposed, though the inhumanity of anatomia vivorum was by Celsus justly reproved; yet in regard of the great use of this observation, the inquiry needed not by him so slightly to have been relinquished altogether, or referred to the casual practices of surgery; but mought have been well diverted upon the dissection of beasts alive, which, notwithstanding the dissimilitude of their parts, may sufficiently satisfy this inquiry."—*Advancement of Learning, Book 2, x 5.*

[3] In 1885 the writer reported the results of experiments on cats in which the sciatic nerve was divided under ether and the peripheral end subsequently subjected to prolonged stimulation. Although this stimulation could not by any possibility have been accompanied by any sensation, the experiments are continually cited in anti-vivisectionist literature as cases of atrocious cruelty. Mr. Philip G. Peabody, for instance, comments as follows: "It will be readily seen, even by the casual reader, that it involves an amount of agony beyond which science is unable to go, and to approximate to which is impossible except by a person who has devoted long years to the study of nerves."—*Leaflet published by the N. E. Antivivisection Society.*

These same experiments were classified by Miss F. P. Cobbe ("Nine Circles," 2d ed., p. 15) as operations on the spine, and to prove that they must have been painful a statement from Landois & Stirling's Physiology is quoted to the effect that hemisection of the spinal cord produces hyperæsthesia on the same side below the point of section!

Even Dr. Albert Leffingwell, a writer who is comparatively reasonable in his opposition to vivisection, in a recently published pamphlet entitled Does Science Need Secrecy? cites these experiments as evidence of cruelty practised in the Harvard Medical School.

[4] Memorials and resolutions on this subject have been passed by medical and scientific societies in all parts of the world. As an example of their general purport, it will suffice to quote the following resolution unanimously passed at the International Medical Congress held in London, August 9, 1881, by twenty-four hundred of the foremost physicians of the world:

"This congress records its conviction: That experiments on living animals have proved of the utmost service to medicine in the past and are indispensable to its future progress; that, while strongly deprecating the infliction of unnecessary pain, it is of the opinion, alike in the interest of man and of animals, that it is not desirable to restrict competent persons in the performance of such experiments."

Though the educated physicians of the world are practically unanimous in their

belief in the necessity and utility of vivisection, the antivivisectionists do not hesitate to denounce the pursuit in language of which the following extracts from letters of Col. Robert G. Ingersoll to Philip G. Peabody, esq., published by the Illinois Antivivisection Society, may be taken as an example:

"Vivisection is the Inquisition—the hell—of science. All the cruelty which the human—or rather the inhuman—heart is capable of inflicting is in this one word. Below this there is no depth. This word lies like a coiled serpent at the bottom of the abyss."

"The wretches who commit these infamous crimes pretend that they are working for the good of man."

"Not one fact of importance to the human race has been ascertained by these scientific assassins."

"It is impossible to imagine an argument in favor of this barbarism and the savagery of science. Nothing can be said in its defense."

"The vivisector is less valuable to the world than the animal he destroys."

A collection of the epithets applied by antivivisectionists to their opponents may be found on pages 18–21 of a pamphlet entitled The Utility and Morality of Vivisection, by G. Gore, LL. D., F. R. S., London, 1884.

[5] In a pamphlet entitled Twelve Years' Trial of the Vivisection Act—Has It Stopped the Scientific Torture of Animals in England? by M. R. C. S., London, 1889, the English law is pronounced a failure.

The Illinois Antivivisection Society prints the following statement in its various publications: "The restrictive act, in England, after a trial of nineteen years, has failed to restrict—according to official returns. There is no reason to doubt it would be the same in America. The 74 societies of the world are demanding total abolition."

[6] "Vivisection; a lecture delivered in the assembly chamber of New York, at Albany, before a joint committee of both houses of the legislature, February 10, 1880," page 15. Mr. Bergh apparently intends to refer to the testimony of Dr. Robert McDonnell, given before the royal commission in 1876. (See Blue Book, p. 228, sec. 4547.)

[7] The vote passed by the councilors June 7, 1892, and by the society June 8, 1892, was as follows:

"Whereas the Massachusetts Society for the Prevention of Cruelty to Animals has asked for some official action on the part of the Massachusetts Medical Society, in the form of a resolution, or otherwise, as to whether in their judgment any law, and, if so, what law, should be enacted by our legislature to restrain or limit the practice of vivisection by physicians, medical or other students, or pupils in medical or other colleges or schools: Therefore,

"*Resolved*, That the councilors are not aware that vivisections are practiced in this State in an unnecessary or cruel manner.

"That the existing statutes furnish sufficient security against cruelty in vivisection as well as against cruelty in general;

"That experience has shown it to be very undesirable to impose restrictions of any kind upon the advancement of medical science by the researches of properly qualified persons;

"That in view of the above facts it is, in the opinion of the councilors, inexpedient to legislate upon this subject;

"That a copy of the above preamble and resolutions be transmitted to the Massachusetts Society for the Prevention of Cruelty to Animals."

The sentiments of the society were reaffirmed by the councilors in the following resolution, adopted June 9, 1896:

"Whereas the councilors of the Massachusetts Medical Society have learned that a bill has been introduced into the Congress of the United States for the restriction of biological research in the District of Columbia:

"*Resolved*, That a copy of the resolution adopted by the Massachusetts Medical Society in response to a communication from the Massachusetts Society for the Prevention of Cruelty to Animals on June 8, 1892, be forwarded to the Senators and Representatives of this State as an expression of the opinion of the Massachusetts Medical Society with regard to legislation on this subject, either in Massachusetts or in the District of Columbia."

[8] London Athenæum, September 22, 1866.

[9] "The Vivisection Act," by the Right Hon. Robert Lowe, Contemporary Review, October, 1876.

[10] The following extract from a pamphlet issued by the Society for the Abolition of Vivisection, illustrates the danger of restrictive legislation, as well as the spirit in which the warfare against medical science is conducted:

"THE BEGINNING OF THE END.

"The succeeding advertisement, publishing abroad a fact so important and encouraging to the cause, and so striking a proof of the success of our crusade, was inserted in the Morning Post of September 13, 14, and 15, 1881; Nature of September 15; the Standard of September 15, 16, and 17; the Athenæum of September 17; the Times of September 20, 21, and 23; the Saturday Review of September 24; and Galignani's Messenger of September 19, 20, and 21.

"VIVISECTION.—THE BEGINNING OF THE END. The HOME SECRETARY has REFUSED CERTIFICATES to Professor Fraser, Dr. Lauder Brunton, and Professor Lister, for carrying on investigations which they declare to be of 'the highest value to Medical Science.'

"GEORGE R. JESSE,
"Hon. Sec. etc., Society for the Abolition of Vivisection.
"HENBURY, NEAR MACCLESFIELD, CHESHIRE, *10th September, 1881.*"

[11] See, for example, the controversy between Miss Frances Power Cobbe and Prof. Victor Horsley, London *Times*, October 17, 1892.

[12] The New York law against cruelty to animals was enacted in 1867. While on its passage the late Dr. J. C. Dalton secured the insertion of § 10 (quoted in the text). Against this clause Mr. Bergh publicly protested, and in 1880, 1881, and 1882 sought in vain to secure the enactment of a law for the total prohibition of vivisection.

[13] [From the New York Nation, November, 1879.]

* * * * * * *

"According to Mr. Bergh, Brown-Séquard has an exceedingly low opinion of experiments on the spinal cord; and he quotes him, in the New York Tribune of September 26, 1874, as expressing this opinion in very plain terms. The passage is as follows:

"'Even Dr. Brown-Séquard himself, the very prince of experimenters, says: "I must say that it is impossible to know, while we make a section of the parts of a spinal cord, what is the precise depth of the injury; it is mere guesswork.'

"Evidently, then, there can be no use in making the section. As the whole object of such an experiment is to learn what nervous endowments belong to a particular part, if we do not know what part has been reached by the section we can get from it no useful information. But why did Brown-Séquard go on making such experiments when he knew that it was impossible to learn anything from them? Perhaps he can tell us.

"The above quotation is from Dr. Brown-Séquard's 'Lectures on the Physiology and Pathology of the Central Nervous System' (Philadelphia: 1860). It is to be found on page 42 in a footnote. Mr. Bergh gives the quotation correctly, so far as it goes. The trouble is, he does not give the whole of it. The entire passage is as follows:

"'I must say that it is absolutely impossible to know, while we make a section of parts of a spinal cord, what is the precise depth of the injury; it is mere guesswork. But if we study well the phenomena, and then, after having killed the animal, if we put the spinal cord in alcohol, we render it hard, and we can ascertain exactly what is the extent of the incision. This is the means that I always employ in my experiments, and it is also the means employed by the committee appointed by the Société de Biologie in 1855 for the investigation of my researches on the spinal cord.'

"So it appears that Dr. Brown-Séquard has no doubt about the exact spot reached by his incision in the spinal cord; and no one who has the opportunity of reading his original passage can have any doubt about it either. Would it be too much to say that the audacity of curtailing his language to give it an opposite sense has something about it almost ludicrous?

* * * * * * *

"J. C. D.

"NEW YORK, *November 14, 1879.*"

[14] SENATE BILL 1552.

For the further prevention of cruelty to animals in the District of Columbia.*

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter no person shall perform on a living vertebrate animal any experiment calculated to give pain to such animal, except subject to the restrictions hereinafter prescribed. Any person performing, or taking part in performing, any experiment calculated to give pain, in contravention of this act, shall be guilty of an offense against this act, and shall, if it be the first offense, be liable to a penalty not exceeding one hundred and fifty dollars, and if it be the second or any subsequent offense, shall be liable, at the discretion of the court by which he is tried, to a penalty not exceeding three hundred dollars, or to imprisonment for a period not exceeding six months.

SEC. 2. That the following restrictions are imposed by this act with respect to the performance on any living vertebrate animal of an experiment calculated to give pain to such animal; that is to say:

(a) The experiment must be performed with a view to the advancement by new discovery of physiological knowledge, or of knowledge which will be useful for saving or prolonging life or alleviating suffering; and

(b) The experiment must be performed by a person holding such license from the Commissioners of the District of Columbia as in this act mentioned, or by a duly authorized officer of the Government of the United States, or of the District of Columbia; and

(c) The animal must, during the whole of the experiment, be completely under the influence of ether or chloroform sufficiently to prevent the animal from feeling pain; excepting only that in so-called inoculation experiments, or tests of drugs or medicines, the animal need not be anæsthetized nor killed afterwards; nor in tests of surgical procedure need animals be kept completely anæsthetized during the process of recovery from the surgical operation. Otherwise than this, the animal must be kept from pain during all experiments; and

(d) The animal must, if the pain is likely to continue after the effect of the anæsthetic has ceased, or if any serious injury has been inflicted on the animal, be killed before it recovers from the influence of the anæsthetic which has been administered; and

(e) No experiment shall be made upon any living creature calculated to give pain to such creature in any of the public schools of the District of Columbia; provided as follows—that is to say:

First. Experiments may be performed under the foregoing provisions as to the use of anæsthetics by a person giving illustrations of lectures in medical schools, hospitals, or colleges, on such certificate being given, as in this act hereafter mentioned, that the proposed experiments are absolutely necessary for the due instruction of the persons to whom such lectures are given, with a view to their acquiring physiological knowledge or knowledge which will be useful to them for saving or prolonging life or alleviating suffering.

Second. The substance known as urari, or curare, shall not, for the purposes of this act, be deemed to be an anæsthetic; and

Third. Notwithstanding anything in this act contained, no experiment calculated to give pain shall be performed on a dog or cat, except upon such certificate being given as in this act mentioned, stating, in addition to the statements hereinbefore required to be made in such certificate, that for reasons specified in the certificate the object of the experiment will be necessarily frustrated unless it is performed on an animal similar in constitution and habits to a cat or dog and no other animal is available for such experiment; and an experiment calculated to give pain shall not be performed on any horse, ass, or mule, except on such certificate being given as in this act mentioned, that the object of the experiment will be necessarily frustrated unless it is performed on a horse, ass, or mule, and that no other animal is available for such purpose; and

Fourth. Any exhibition to the general public, whether admission be on payment of money or gratuitous, of experiments on living animals, calculated to give pain, shall be illegal.

Any person performing or aiding in performing such experiment shall be deemed to be guilty of an offense against this act, and shall, if it be the first offense, be liable to a penalty not exceeding one hundred and fifty dollars, and if it be the second or any subsequent offense, shall be liable, at the discretion of the court by which he is

*As favorably reported to the Senate May 26, 1896, by the Committee on the District of Columbia.

tried, to a penalty not exceeding three hundred dollars or to imprisonment not exceeding six months; and any person publishing any notice of any such intended exhibition by advertisement in a newspaper, placard, or otherwise, shall be liable to a penalty not exceeding ten dollars.

A person punished for an offense under this section shall not for the same offense be punishable under any other section of this act.

SEC. 3. That the Commissioners of the District may insert, as a condition of granting any license, a provision in such license, that the place in which any such experiment is to be performed by the licensee is to be registered in such manner as the said Commissioners may from time to time by any general or special order direct: *Provided*, That every place for the performance of experiments for the purpose of instruction shall be approved by the said Commissioners, and shall be registered in such manner as the said Commissioners may from time to time by any general or special order direct.

SEC. 4. That the Commissioners of the District, upon application as hereinafter prescribed, may license any person whom they may think qualified to hold a license to perform experiments under this act: *Provided* only that a license shall not be granted to any person under the age of twenty-five years, unless he be a graduate from a medical college, duly authorized to practice medicine in the District of Columbia.

SEC. 5. That the Commissioners of the District may direct any person performing experiments under this act from time to time to make reports to them of the methods employed and the results of such experiments, in such form and with such details as the said Commissioners may require.

SEC. 6. That the President of the United States shall cause all places where experiments on living vertebrate animals are carried on in the District of Columbia to be from time to time visited and inspected, without previous notice, for the purpose of securing compliance with the provisions of this act, and to that end shall appoint four inspectors, who shall serve without compensation, and who shall have authority to visit and inspect the places aforesaid, and who shall report to the President of the United States from time to time the results of their observations therein, which shall be made public by him.

SEC. 7. That any application for a license under this act, and for a certificate to be given as in this act mentioned, must be signed by three physicians duly licensed to practice and actually engaged in practicing medicine in the District of Columbia, and also by a professor of physiology, medicine, anatomy, medical jurisprudence, materia medica, or surgery in the medical department of any duly established and reliable school or college in the District of Columbia: *Provided*, That when any person applying for a certificate under this act is himself one of the persons authorized to sign such certificate the signature of some other of such persons shall be substituted for the signature of the applicant.

A certificate under this section may be given for such time or for such series of experiments as the persons signing the certificate may think expedient.

A copy of any certificate under this section shall be forwarded by the applicant to the Commissioners of the District, but shall not be available until one week after a copy has been so forwarded.

The Commissioners of the District may at any time disallow or suspend any certificate given under this section.

SEC. 8. That the powers conferred by this act of granting a license or giving a certificate for the performance of an experiment on living animals may be exercised by an order in writing, under the hand of any judge of a court of record having criminal jurisdiction in the District, in a case where such judge is satisfied that it is essential for the purposes of justice in a criminal case to make such experiment.

[15] [From Our Dumb Animals, August, 1891.]

Our antivivisection friends have now been at work in Europe some twenty years and in America some ten. What have they accomplished?

In continental Europe there has been an enormous increase of vivisection, and, so far as we can learn, not a single case ever prevented.

In America the same.

In England, where some laws have been enacted, an enormous increase of vivisection.

* * * * * * *

(Signed) GEO. T. ANGELL.

[From Our Dumb Animals, December, 1892.]

It is a question in my mind whether the denunciations they (the antivivisection societies) have heaped upon the medical profession have not increased rather than diminished the practice.

* * * * * * *

Stop at once all denunciation, and, in the spirit of kindness and Christianity, seek the aid of medical societies, medical schools, and the medical profession.

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(Signed) GEO. T. ANGELL.

[16] [From Our Dumb Animals, April, 1896.]

VIVISECTION AT OUR STATEHOUSE.

We have had three hearings at our statehouse for the purpose of obtaining a law which will permit our agents to be present and witness vivisections and experiments performed in Massachusetts on living animals.

We are opposed by the president of Harvard University, the Massachusetts Institute of Technology, and various colleges, the president of the Massachusetts Medical Society, various medical schools, and large numbers of medical men.

* * * * * * *

The following was our opening address at the first hearing before the judiciary committee on February 27.

* * * * * * *

"In conclusion, it is related that a newly arrived immigrant arrested for some offense and brought into one of our courts exhibited such terror that the clerk of the court kindly told him 'that he need not be afraid for justice would certainly be done him,' to which he replied, 'that that was just what he was afraid of.'"

It seems to us that any person or institution that, instead of welcoming, opposes our coming must be in a similar condition to the person above referred to.

GEO. T. ANGELL.

[17] [Extract from the stenographic report of the hearing for the petitioners, February 27, 1896.]

Cross-examination of Mr. Angell by counsel for remonstrants:

Q. This bill is promoted by your society or yourself?—A. By the society, of course.

Q. Has the society taken any action in regard to this bill?—A. It has been brought before our directors.

Q. Did they pass a vote in regard to it?—A. I guess so. How was that, Mr. Hill?

Mr. HILL. The bill was proposed with their acceptance.

Q. And there was formal action taken?

Mr. HILL. We have not the record here, so I could not tell you that.

* * * * * * *

Q. (To Mr. Angell.) How many directors are there?—A. Twenty-four, I think.

Q. How many were present at that meeting where the matter was brought up?—A. Seven or eight, it is my impression.

Q. You don't remember whether any formal action was taken?—A. It came a very stormy day, and I think not more than seven or eight were present.

Q. Yourself and Mr. Hill and five others?—A. I think so.

Q. You don't remember whether any formal action was taken?—A. No; but the president has authority to take charge of the work of the society.

Q. Then the specific thing which is done here is done under your general authority as president?—A. Very largely; yes, sir.

[18] [Bill presented by the society with its successive modifications.]

AN ACT RELATING TO VIVISECTION IN SCHOOLS. (HOUSE 548.)

Be it enacted, etc., SECTION 1. No vivisection of any dog, cat, or other warm-blooded animal shall be practiced or permitted in any school, except regularly incorporated universities, colleges, and medical schools.

SEC. 2. No experiment upon any live animal, which subjects such animal to pain, shall be performed or permitted in any school or educational institution, except for the purpose of relieving such animal from suffering, unless such experiment shall be

authorized by a permit from the State board of health, specifying the object thereof and the number and kind of animals to be subjected thereto. Said board shall keep a record of each permit so granted, which shall be open to public inspection.

SEC. 3. Any agent of the Massachusetts Society for the Prevention of Cruelty to Animals may be present at any experiment designated in this act, and shall at all times be permitted to witness the same; and the time and place of any such experiment shall, upon the request of such agent, be made known to him.

SEC. 4. Whoever violates any provision of this act shall be punished by a fine of not less than twenty dollars, nor more than one hundred dollars; and all fines collected upon or resulting from prosecutions under this act shall be paid to the Massachusetts Society for the Prevention of Cruelty to Animals, in aid of the benevolent work for which said society was incorporated.

SEC. 5. This act shall take effect upon its passage.

AN ACT RELATING TO VIVISECTION IN SCHOOLS.

Be it enacted, etc. SECTION 1. Any agent or agents of the Massachusetts Society for the Prevention of Cruelty to Animals may be present at any experiment on or dissection of any live animal in any school or educational institution in this Commonwealth, and shall be permitted to witness the same; and the time and place of any such experiment or dissection shall, upon the request of any such agent, be made known to him by the person having charge of such experiment or dissection.

SEC. 2. Whoever violates this act by preventing any such agent from being present or failing to give such agent information when requested, as above provided, shall be punished by a fine of not less than twenty dollars nor more than one hundred dollars.

AN ACT RELATING TO VIVISECTION IN SCHOOLS.

SECTION 1. Agents of the Massachusetts Society for the Prevention of Cruelty to Animals, especially designated for the purpose by the board of directors of the said society, may be present at any experiment on or dissection of any live animal in any school or educational institution in this Commonwealth, and shall be permitted to witness the same; and the time and place of any such experiment or dissection shall, upon the request of any such agent, be made known to him by the person having charge of such experiment or dissection.

Provided that not more than twenty persons shall be so designated, and that no person shall be so designated who has not received a degree of Doctor of Medicine from a legally chartered medical college or university having power to confer degrees in medicine in this Commonwealth.

SEC. 2. Whoever violates this act by preventing any such agent from being present or failing to give any such agent information when requested as above provided, shall be punished by a fine not less than twenty dollars nor more than one hundred dollars.

[19] See "O-Kee-Pa: A religious ceremony and other Customs of the Mandans," by George Catlin. London, 1867.

[20] Brunton (Pharmacology and Therapeutics, page 92) quotes and confirms Schiff's observation "that the sensory nerves have their conducting power destroyed by curare, but that they are less affected and after a longer interval than the motor nerves."

[21] Fortnightly Review, March, 1882.

[22] Harvey's own words are: "Multa frequenter et varia animalia viva introspiciendo." The translation in the text is therefore more literal than that given in the English edition of Harvey's works, published by the Sydenham Society, which reads as follows: "Having frequent recourse to vivisections, employing a variety of animals for the purpose."

Notwithstanding this direct testimony of Harvey himself, we constantly find in antivivisectionist literature the statement that the discovery of the circulation of the blood was not made by means of vivisections. Thus Lawson Tait, in his pamphlet "on the usefulness of vivisection upon animals as a method of scientific research," writes "that he (Harvey) made any solid contribution to the facts of the case by vivisection is conclusively disproved, and this was practically admitted before the royal commission by such good authorities as Dr. Acland and Dr. Lauder Brunton." A complete refutation of both of these statements may be found on p. 136 and p. 146 of the work on "Physiological Cruelty," already alluded to.

[23] See Physiological Cruelty, p. 70.

[24] [Extract from an article on "The treatment of diphtheria by antitoxin," by William H. Welch, M. D.]—From Johns Hopkins Hospital Bulletin July-August, 1895.

The discovery of the healing serum is entirely the result of laboratory work. It is an outcome of the studies of immunity. In no sense was the discovery an accidental one. Every step leading to it can be traced, and every step was taken with a definite problem.

These studies and the resulting discoveries mark an epoch in the history of medicine. It should be forcibly brought home to those whose philozoic sentiments outweigh sentiments of true philanthropy that these discoveries which have led to the saving of untold thousands of human lives have been gained by the sacrifice of the lives of thousands of animals and by no possibility could have been made without experimentation upon animals.

[25] Public Health Reports, II, p. 595.

OUR RECENT DEBTS TO VIVISECTION.

[Extracts from the address to the graduates at the thirty-third commencement of the Woman's Medical College of Pennsylvania, March 11, 1885. By William W. Keen, A. M., M. D., professor of surgery. Reprinted from The Popular Science Monthly, May, 1885.]

You must also direct public opinion, and especially the opinion of your own sex, in reference to medical questions, for your information and studies will fit you to be their instructors in all such technical questions.

It is to one of these medical issues of the day that I purpose to direct your attention at present—one as to which intense feeling, especially among women, has been aroused—viz, the question of experiments upon animals.

Epithets and invective have been freely used, but, as befits the audience and the occasion, I shall endeavor to approach it in a perfectly calm and fair spirit, seeking to lay before you only one aspect of a many-sided question, viz, the actual practical benefits it has conferred upon man and animals—a fact that is constantly denied, but which medical evidence proves to be incontestable.

I shall not consider the important older discoveries it has given us, but only those since 1850, almost all of which are within my own personal recollection. Even of these I must omit nearly all of its contributions to physiology and to pathology, though so much of our practice is based upon these, and confine myself to the advances it has enabled us to make in medical and surgical practice. I shall endeavor to state its claims with moderation, for an extravagant claim always produces a revulsion against the claimant and is as unwise as it is unscientific.

Again, it must be borne in mind that, as in nearly every other advance in civilization and in society, so in medicine, causes are rarely single, but generally multiple and interwoven. While vivisection has been a most potent factor in medical progress, it is only one of several factors the disentanglement of which and the exact balancing of how much is due to this or to that are often difficult and sometimes impossible. Let me add one word more. All that I may say is purely upon my own responsibility. I commit the opinion of no one else to any view or any statement of fact.

Medicine in the future must either grow worse, stand still, or grow better.

To grow worse, we must forget our present knowledge—happily, an *inconceivable idea.*

To stand still, we must accept our present knowledge as a finality, complacently pursuing the well-worn paths, neither hoping nor trying for anything better—happily, again, an impossibility.

To grow better, we must try new methods, give new drugs, perform new operations, or perform old ones in new ways; that is to say, we must make experiments. To these experiments there must be a beginning; they must be tried first on some living body, for it is often forgotten that the dead body can only teach manual dexterity. They must then be tried either on an animal or on you. Which shall it be? In many cases, of course, which involve little or no risk to life or health it is perfectly legitimate to test probable improvements on man first, although one of the gravest and most frequent charges made against us doctors is that we are experimenting upon our patients.

But in many cases they involve great risk to life or health. Here they can not, nay, they must not, be tested first upon man. Must we, then, absolutely forego them, no matter how much of promise for life and health and happiness they possess? If not, the only alternative we have is to try them on the lower animals, and we would be most unwise, nay, more, we would be cruel, cruel both to man and to animals, if we refused to pain or even to slay a few animals that thousands, both of men and of animals, might live.

Who would think it right to put a few drops of the hydrochlorate of cocaine (a year ago almost an unknown drug) into the eye of a man, not knowing what frightful inflammation or even loss of sight might follow? Had one dared to do it, and had the result been disastrous, would not the law have held him guilty and punished him severely, and all of us said amen? But so did Christison with Calabar bean, and well-nigh lost his own life. So did Toynbee with prussic acid on himself, and was found dead in his laboratory.[1] Accordingly, Koller, of Vienna,

[1] I add the following striking extract from a speech in defense of vivisection, on April 4, 1883, by Sir Lyon Playfair, deputy speaker of the House of Commons—no mean authority. The italics are my own:

"For myself, although formerly a professor of chemistry in the greatest medical school of this country, I am only responsible for the death of two rabbits by poison, and I ask the attention of the house to the case as a strong justification for experiments on animals, *and yet I should have been treated as a criminal under the present act had it then existed.* Sir James Simpson, who introduced chloroform—that great alleviator of animal suffering—was then alive and in constant quest of new anæsthetics. He came to my laboratory one day to see if I had any new substances likely to suit his purpose. I showed him a liquid which had just been discovered by one of my assistants, and Sir James Simpson, who was bold to rashness in experimenting on himself, desired immediately to inhale it in my private room. I refused to give him any of the liquid unless it was first tried upon rabbits. Two rabbits were accordingly made to inhale it; they quickly passed into anæsthesia and apparently as quickly recovered, but from an after action of the poison they both died a few hours afterwards. *Now, was not this a justifiable experiment upon animals? Was not the sacrifice of two rabbits worth saving the life of the most distinguished physician of his time?* * * * Would that an experiment of a like kind on a rabbit or a guinea-pig had been used by John Hunter, who probably shortened his own noble life by experimenting on himself! * * *

"Let me give one other instance. * * * A few years ago two young German chemists were assistants in a London laboratory. They were experimenting upon a poison which I will not even name, for its properties are so terrible. It is postponed in its action, and then produces idiocy or death. An experiment on a mouse or a rabbit would have taught them the danger of this frightful poison; but, in ignorance of its subtle properties, they became its unhappy victims, for one died and the other suffered intellectual death. Yet the promoters of this bill would not suffer us to make any experiments on the lower animals *so as to protect man* from such catastrophes. It is by experiments on animals that medicine has learned the benefits, but also has been taught to avoid the dangers of many potent drugs—as chloroform, chloral, and morphia."

properly and wisely tried cocaine first on animals, and[1] then, finding its beneficial effects, tried it upon man with like results, and one of the most remarkable drugs of modern times was thus made available. We are only on the threshold of its usefulness. It has been used in the eye, the ear, the nose, the mouth, the larynx, and all other mucous membranes, in the removal of tumors, and as an internal medicine. When its physiological action has been still more thoroughly and systematically investigated, its poisonous dose ascertained, when we know how it works, what its effects are upon the blood pressure, the heart, the nerves, the blood vessels—effects that can not be accurately studied upon man—its usefulness may be increased to an extent as yet but little dreamed of. Should it only soothe the last painful hours of our great hero, General Grant, a nation will bless it and the experiments which gave it effect. Moreover, had the experiments of Dr. Isaac Ott, of Easton,[2] on this very drug, borne their due fruit, America would have had the honor and the human race the benefits of cocaine ten years ago—ten years of needless suffering!

This is but one illustration of the value of experiments upon animals in the realm of new drugs. In fact, substitute for cocaine other drugs, or new operations, or new methods of medical treatment, and the argument repeats itself for each. Within the last thirty years a multitude of new drugs have thus been discovered, and their effects have been either first tested upon animals or their properties studied exhaustively in a manner impracticable upon man. I will only enumerate some of them, since time will not allow me to enter upon each in detail. Thus have been introduced lily of the valley in heart disease, yellow jasmine in diseases of the heart and nervous system, paraldehyde and chloral hydrate, so valuable for sleep, caffeine for headache, eucalyptus as an antiseptic and in medicine, nitroglycerin for nervous maladies, Calabar bean for diseases of the eye and nervous system, naphthaline and iodoform in surgery, quebracho as an antispasmodic, antipyrin and kairin in fever, jaborandi in dropsy, salicylic acid in rheumatism, nitrite of amyl in epilepsy and intermittent fever, jequirity in ophthalmic surgery, piscidia as a substitute for opium, the hypodermic method of using drugs, and so on through a long list. And, as to the old drugs, it may be truly said that we have little exact—that is, scientific—knowledge of any one except through experiments upon animals.[3]

Let us see, now, something of what America has done in advancing practical medicine by vivisection. In passing, I may say that the assertion that America has contributed but little, so far from being

[1] Archives of Ophthalmology, September and December, 1884, p. 402. New York, Putnams.

[2] Ott, "Cocaïn, Veratrin, and Gelsemium," Philadelphia, 1874.

[3] For three hundred years digitalis, for instance, has been given as a depressant of the heart, and, when a student, I was taught to avoid it carefully when the heart was weak. But the accurate experiments of Bernard and others have shown that it is, on the contrary, actually a heart tonic and stimulant. So long as I live I shall never forget the intense joy of myself and the agonized parents when one bright young life was brought back from the very grave, some five years ago, by the knowledge of this fact, and this is but one of many such cases. Thus have the action and dangers of our common anæsthetics been positively and accurately ascertained; thus the action of ergot on the blood vessels, explaining alike its danger as an article of food and its wonderful use in certain tumors of the uterus and diseases of the nervous centers; thus, too, everyone who gives opium in its various forms is a debtor to Bernard, and everyone who gives strychnine a disciple of Magendie.

an argument for the restriction of vivisection, is a strong argument for its further cultivation, in order that greater good may result from remarkable discoveries here, equal to those that I shall show have been made in Europe.

Wounds of the abdomen, especially gunshot wounds, are among the most fatal injuries known to surgery. A small, innocent-looking, external pistol wound may cover multiple and almost inevitably fatal perforations of the abdominal contents. The recoveries from 3,717 such wounds during the late civil war only numbered 444, and of those with escape of the intestinal contents the recoveries, says Otis, may be counted on one's fingers. The prevailing treatment as laid down in our text-books has been purely conservative, treating symptoms as they arise. The brilliant results achieved in other abdominal operations have led a few bold spirits, such as our own Sims, Gross, Otis, McGuire, and others, to advocate the opening of the abdomen and the repair of the injuries found.

In May of last year Parkes, of Chicago, reported to the American Medical Association[1] a series of systematic experiments on 37 dogs, that were etherized, then shot, the abdomen opened, and the wounds of the intestines, arteries, mesentery, etc., treated by appropriate surgical methods. The results confirmed the belief awakened by earlier experiments and observations that surgery could grapple successfully with multiple and formidable wounds, by sewing them up in various ways, or even by removing a piece of the bowel and uniting the cut ends. Hard upon the heels of this important paper, and largely as its result, comes a striking improvement in practice. And remember that this is only the first fruit of a rich harvest for future time, in all countries, in peace and in war.

November 2 of last year a man was brought to the Chambers Street Hospital, in New York, with a pistol-shot wound in the abdomen. Under careful antiseptic precautions, and following the indications of Parkes, the abdomen was opened by Dr. Bull,[2] coil after coil of the intestions was drawn out, the bullet was found and removed, and 7 wounds of the intestines were successively discovered and properly treated, and the patient made an uninterrupted recovery. A recovery, after so many wounds, any one of which would necessarily have been fatal under the old methods of treatment, shows that we have now entered upon a proper and successful method of treatment for such frightful accidents.

This is but one of the remarkable achievements of late years in abdominal surgery. The spleen has been removed, part of the stomach has been cut out for cancer, part of the bladder has been dissected away, the entire gall bladder has been removed, and several inches of the intestine have been cut out, all with the most remarkable success. To all of these, experiments upon animals have either led the way or have taught us better methods. To recite each in detail would occupy too much time, but one illustration I must not omit, for the improvement, produced by it and other experiments, affects every abdominal operation. When I was a student, the peritonæum was avoided by

[1] Medical News, May 17, 1884. I shall refer readers frequently to this journal, as it is often more accessible than foreign journals, and it will refer them to the original papers.

[2] Medical News, February 14, 1885.

knife and needle wherever possible. After the death of his fourth case of ovariotomy, Mr. (now Sir Spencer) Wells,[1] in making the post-mortem, was led to believe that the then received treatment of the peritonæum was incorrect, and that he ought to bring its surfaces in contact in order to obtain secure union. Accordingly, instead of testing his ideas upon women, he experimented upon a few dogs, and found that his suspicions were correct. Since then it has been accepted as a cardinal point in all abdominal operations. Following this came improvements in the ligatures used, in the method of treating the pedicle, in the use of antiseptics, etc., all more or less the result of experiments upon animals, and what are the results? Taking successive hundreds of cases, Sir Spencer Wells's percentage of mortality has decreased steadily from 34 per cent to 11 per cent. In 1,000 operations he has saved 769 women from the grave and added a net gain of 17,880 years to human life, to say nothing of the happiness of the thousands related to them by ties of friendship and of blood—a proud boast indeed!

Since then, others have reduced the percentage of deaths after ovariotomy to three in the hundred; and Martin, of Berlin, has lost but one patient from blood poisoning in his last 130 cases.

It can not be claimed, of course, as to all this wonderful history of abdominal surgery—and remember that in 1862, when I was a medical student, I heard ovariotomists denounced from a professor's chair as murderers!—that experiments upon animals have done the whole work. No one man, no one series of experiments has sufficed, and experiment alone would not have done it. But had such experiments not been made on animals, as to the peritonæum, the pedicle, the sutures, the ligatures, etc., we should be far behind where we now are, and still be ignorantly sacrificing human life and causing human suffering.

But to return to America. The first condition to successful treatment is an accurate knowledge of what any disease is—its cause and its course—then we may guide it, and in due time, it may be, cure it.

Before Dr. H. C. Wood's[2] accurate experiments on the effects of heat on animals, the nature and effects of sunstroke, were almost matters of mere conjecture. Everyone had his own theory, and the treatment was equally varied. Even the heat effects of fever itself—the commonest of all symptoms of disease—were ill understood. Wood exposed animals to temperatures of 120° to 130° F., and studied the effects. These experiments have often been alluded to as "baking animals alive." You will note that the heat was no greater than that to which laborers are frequently exposed in our hot summer days, when working in the sun, or in many industrial works. His experiments showed that the effects of sunstroke—or, as he happily termed it, thermic or heat fever, a scientific name now widely adopted—were solely due to the heat, death following from coagulation of the muscular structure of the heart, or by its effects on the brain. They explained also many of the phenomena of ordinary fever as the result of heat alone. They have established the rational and now generally adopted treatment of sunstroke by reduction of the body temperature;

[1] Wells, Ovarian and Uterine Tumors, 1882, p. 197.
[2] Wood, Thermic Fever or Sunstroke, Philadelphia, 1872.

and the same method is now beginning to be appreciated and employed in ordinary fever.[1]

The same observer, with Dr. Formad, has made important experiments on the nature of diphtheria, and when we learn, as we probably soon shall, how to deal with the microscopic forms of life which seem to be its cause, it will not be too much to hope that we may be able to cope far more successfully with a disease now desolating so many homes. [This prophecy was made, observe, in 1885. For its splendid fulfillment see Professor Hare's address.]

In India alone 20,000 human beings die annually from snake bite,[2] and as yet no antidote has been discovered. How can we search intelligently for an antidote until we know accurately the effects of the poison? This can not be studied on man; we must resort to animals or let the holocaust go on. Accordingly, Dr. T. Lauder Brunton began such a series of experiments in London, *but was stopped by the stringent antivivisection laws there in force.* But Drs. Weir Mitchell and Reichert,[3] in this city, have recently undertaken experiments on cobra and rattlesnake venom, the cobra poison being furnished, be it observed, by the British Government, whose own laws have prevented investigations for the benefit of its own subjects. The results are as yet only partly made known, but they have been brilliantly successful in showing that there are two poisons in such venom, each of which has been isolated and its effects studied. The first step has been taken—the poison is known. Who will raise a finger to stop progress toward the second—the antidote? Can the sacrifice of a few score of animals each year in such research weigh for a moment against the continuous annual sacrifice of 20,000 human beings?[4]

The modern history of anæsthetics is also of interest. To say nothing of ether and chloroform, whose safer use Bert has investigated in France, nor of cocaine, to which I have already alluded, let us see what experiments on animals have shown us as to bromide of ethyl—an anæsthetic lately revived in surgery. Its revival has quickly been followed by its abandonment on account of the frequent sacrifice of human life—that is to say, *experiments on human beings* have proved it to be deadly. Now, Dr. H. C. Wood,[5] soon after its reintroduction, made a study of its effects on animals, and showed its physiological dangers. Had his warnings been heeded, not a few human lives would have been saved.

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[1] Eighteen out of Wood's experiments were on the general effects of heat, as above alluded to. In six others the local effects of heat (135° to 190° F.) on the brain, and in four others the local effects (up to 140° F.) on the nerves were studied and gave most valuable results, entirely and evidently unattainable on man.

[2] Fayrer, Thanatophidia of India, p. 32.

[3] Medical News, April 28, 1883.

[4] I am permitted by Rev. R. M. Luther, of this city, to state the following fact in illustration of the practical value of vivisection in snake bite: When a missionary in Burmah, he and his brother-in-law, Rev. Mr. Vinton (two missionary vivisectionists), made a number of experiments to discover an antidote to the poison of the "brown viper"—a snake but little less venomous than the cobra. They found a substance which is an antidote in about 60 per cent of the cases if applied at once. Thah Mway, one of their native preachers, when bitten by the brown viper, had some of this antidote with him, and by its use his life was saved when on the verge of death. This one life saved has been the means of leading, it is estimated, 2,000 Karens to embrace Christianity. Was not this one life worth all the dogs used in the experiments—to make no mention of the many other lives that will be saved in all the future?

[5] Philadelphia Medical Times, April 24, 1880.

The ideal anæsthetic, that will abolish pain without abolishing consciousness, and do so without danger, is yet to be found. Cocaine is our nearest approach to it. Now, in all fairness and common sense, would it be real kindness or real cruelty to obstruct the search for such an anæsthetic—a search which will surely be rewarded by success, but which, if not carried on by experiments on animals, must be tried by deadly experiments upon man, or else be hopelessly given up?

In 1869 I was called to see a man suffering to the last degree from an abscess in the loin. I recognized the fact that it arose from the kidney, but I was powerless. All that I could do was to mitigate, and that, alas, but little, his pitiless sufferings till death came to his relief, after nearly a year of untold agony. I have never forgoten his sufferings, nor the sharp pain I felt when I learned, two years later, how I might possibly have saved his life.

In the very same year (1869), Simon, of Heidelberg,[1] had a woman under his care suffering from urinary fistulæ from a healthy kidney—a surgical accident he in vain tried to heal. That she could live with one kidney had the other gradually been disabled by disease was probable, for one such diseased kidney had already been removed three times when mistaken for ovarian disease; and physiologists had often removed one or both kidneys in animals. But no one had removed a healthy kidney and then studied the effects on the remaining kidney and upon the heart; no one had tested what was the best method of reaching the kidney, whether by the abdomen or the loin, or how to deal with its capsule, or the hemorrhage, or the surgical after-effects. Of course, Simon could have tried the experiment on his patient, blindly trusting to Providence for the result. But he chose the wiser course. He studied the previous literature, experimented on a number of dogs and watched the points above noted, tried various methods of operating upon the dead body, and, after weighing all the pros and cons, deliberately cut down upon the kidney of his patient after a carefully formulated plan, not by the abdomen, but through the loin, and saved her life. She died in 1877, after eight years of healthy life, free from her loathsome disorder.

Now, what have been the results of these experiments upon a few dogs? One hundred and ninety-eight times the kidney has been removed, and 105 human lives have been saved; 83 times abscesses in the kidney have been opened, and 66 lives saved; 17 times stones have been removed from the kidney without a single death—or, in all, in the last fifteen years, 298 operations, and 188 human lives saved. Besides this, as an extension of the operation in 17 cases, in which the kidney, having no such attachments as ought to anchor it in place, was floating loosely in the abdomen and a source of severe pain, it has been cut down upon and sewed fast in its proper place; and all of these patients but one recovered.

Looking to the future, when not hundreds but thousands of human beings will enjoy the benefits of these operations, and in increasing percentages of recoveries, are not the sufferings inflicted on these few dogs amply justified as in the highest sense kind and humane?[2]

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[1] Simon, Chirurgie der Nieren, 1871, preface.

[2] Very erroneous views prevail as to the sufferings of animals from experiments upon them. Many persons suppose that "vivisection" means deliberate "cutting up" of an animal, little by little, till not enough is left to live. So far is this from *the truth* that Prof. Gerald Yeo, from the actual reports of vivisectionists in England

Not long since Dr. Ferrier, of London, was prosecuted for the alleged performance of certain experiments on the brains of the lower animals. With Fritsch, Hitzig, Goltz, Yeo, and others, he had destroyed or galvanized certain limited areas of the brain (and it must not be forgotten that the brain is wholly without the sense of pain), and so determined the exact nervous centers for certain limited groups of muscles. As a result of their labors, the brain is now mapped out with reasonable accuracy, so that, given certain hitherto ill-understood or obscure localized symptoms, we can now say that there is certainly a tumor, an abscess, or other disease in precisely this or that locality. True, we can doubtfully infer somewhat of the same from the cruel experiments of disease on man. But nature's experiments are rarely ever limited in area or uncomplicated; they are never systematic and exhaustive; it takes years to collect a fair number of her clumsy experiments, and the knowledge is diffused through many minds instead of being centered in one that will systematize the results.

Said Ferrier, a year ago, in the Marshall Hall oration: "There are already signs that we are within measurable distance of the successful treatment by surgery of some of the most distressing and otherwise hopeless forms of intracranial disease, which will vie with the splendid achievements of abdominal surgery."

Note the fulfillment. Last fall, within a year of the foregoing prophecy, a man, aged 25, entered the London Hospital for Epilepsy and Paralysis.[1] From the symptoms, which I need not detail, Dr. Hughes Bennett, basing his conclusions on Ferrier's experiments, diagnosticated a tumor of small size on the surface of the brain, involving the center of motion for the muscles of the hand. On November 15, 1884, at his instance, Mr. Godlee trephined the skull over the selected spot, and a quarter of an inch below the surface of the brain found a tumor as big as a walnut, and removed it. For three weeks the man did well, but died on the twenty-eighth day from blood-poisoning, such as might follow any operation, especially a new one. Macewen, of Glasgow,[2] has similarly trephined a woman, the victim of slow paralysis of body and mind, and opened an abscess a little distance below the surface, letting out two teaspoonfuls of pus, and followed by entire mental and physical recovery.

By these experiments and operations a wide door is open to surgery in the treatment of diseases within the skull—disease heretofore so obscure and uncertain that we have hardly dared to attack them. The question is not whether death or recovery followed in these particular cases. The great, the startling, the encouraging fact is that, thanks to these experiments, we can now, with well-nigh absolute certainty, diagnosticate, and with the greatest accuracy locate such diseases, and therefore reach them by operation, and treat them successfully. Would

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(Fortnightly Review, March, 1882), estimates that of one hundred such experiments there are:

Absolutely painless	75
As painful as vaccination	20
As painful as the healing of a wound	4
As painful as a surgical operation	1
Total	100

[1] Medical News, January 17, 1885.
[2] Ibid., January 3, 1885.

that I had been born twenty-five years later, that I might enjoy with you the full luxury of such magnificent life-saving, health-giving discoveries.

It is, however, by the experimental study of the effects of minute organisms—microbes, as they are now called—that some of the latest and most remarkable results have been achieved. The labors of Koch, Pasteur, Klein, Cheyne, Tommasi-Crudeli, Wood, Formad, Sternberg, and others are now known even to the daily press. Let us see what they have done.

It is but three years since Koch announced that consumption was caused by the bacillus tuberculosis. Later he has studied cholera and found the comma bacillus, to which he ascribes that dreaded disease. In spite of the opposition of prominent scientists, his views have been in general accepted, and seem to be reasonable.

The method of experiment is simple, though difficult. The suspected expectoration or discharge is placed in a suitable soil, and after cultivation some of this growth is placed in another culture soil, and so on till generation after generation is produced, the violence of the poison being modified by each culture. A small portion of any one of these cultures is then injected under the skin of a mouse or other animal, and in time it dies or is killed, and the results are verified by the post-mortem.

So exact is the knowledge in tuberculosis now that Koch can predict almost to an hour when the mouse will die of consumption, or that it will escape, according to the culture used.

It is far too early as yet to say that these studies have borne the immense practical fruit that the next few years will show; but they have already enabled us to recognize by the microscope doubtful cases of consumption in their earlier and more remediable stages, and have made certain what has hitherto been only a probability—that consumption is distinctly contagious.[1]

By Gerlach's experiments on animals with the milk from tubercular cows, also, it has been shown that consumption may be contracted from such milk. How important this conclusion is, in so universal an article of food to young and old, I need not do aught than state.

The experiments of Wood and Formad on diphtheria I have already alluded to. Those of Tommasi-Crudeli also have shown that probably the poison of malaria is due to like organisms, while a large number of other diseases are being similarly investigated.

As to cholera, the classic experiments of Thiersch, in 1853,[2] are well known. He inoculated 56 mice with cholera discharges. Of these 44 sickened and 14 died from choleraic diseases. In the same year two water companies in London experimented on 500,000 human beings, one of them inoculating its patrons with cholera discharges through its impure water supply. This one sickened thousands and killed 3,476 human beings, most of whom might have escaped had the lessons of Thiersch's 14 mice been heeded. To ask the question, Which was the more cruel? is to answer it.[3]

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[1] Tuberculin has proved of immense value in the diagnosis of tuberculosis in animals, and is again proving itself useful in man (1900).

[2] John Simon, Proceedings International Medical Congress, London, 1881.

[3] The population supplied by the Southwark and Vauxhall Company in the epidemic of 1848–49 died at the rate of 118 in each 10,000, and in that of 1853–54 at the rate of 130 per 10,000. Those supplied by the Lambeth Company died in 1848–49

At present our strenuous efforts are all in one direction—viz, to study these microbes by the microscope, by clinical observation, and by experiments on animals, in order to find out their origin, causes, growth, and effects, and to discover by what means their deadly results may be avoided, or by what remedies, without harm to the patient, they may themselves be destroyed. Evidently these studies can not be tried on our patients. They must either be tried on animals or be abandoned.

We are all familiar now with the numerous deaths from eating pork infected with trichina. While I was in Berlin in 1865–66 a terrible epidemic of the then new disease broke out at Hedersleben, a small town in Prussian Saxony. I well remember with what zeal Virchow and his assistants immediately investigated the disease, inoculated animals with the parasitic worm, studied its natural history, found out that heat killed it; and to-day, as a result of these and other experiments, we all know how to avert its dangers by proper cooking, or to avoid it altogether by the microscope. The value of these experiments, both to human life and to commerce, you know even from the daily papers.

You will find it difficult to make the nonmedical public understand—nay, you yourselves as yet hardly understand—the enormous advance in medicine and surgery brought about by recent researches on inflammation and by the use of antiseptics. My own professional life only covers twenty-three years, yet in that time I have seen our knowledge of inflammation wholly changed, and the practice of surgery so revolutionized that what would have been impossible audacity in 1862 has become ordinary practice in 1885.

It would seem that so old a process as inflammation would long ago have been known through and through, and that nothing new could be adduced. In 1851, however, Claude-Bernard, by a slight operation, divided the sympathetic nerve in a rabbit's neck and showed its influence on the caliber of the blood vessels. In 1858 Virchow published his Cellular Pathology. In 1867 Cohnheim (Virchow's Archiv) published his studies on the part that the blood cells played in inflammation as shown in the frog, followed by further papers by Dr. Norris, of this city, Stricker, Von Recklinghausen, Waldeyer, and many others. Already in my lectures I have pointed out to you in detail the advances made by these studies, both in theory and practice. They have brought about an entire reinvestigation of disease, and given us wholly new knowledge as to abscesses, ulceration, gangrene, the organization of clots in wounds, and after operations and ligature of blood vessels for aneurism, as to thrombosis, and embolism, and paralysis, and apoplexy, and a score of other diseases through the diagnosis and treatment of which now runs the silver thread of knowledge instead of ignorance.

With this the brilliant results of the antiseptic system have joined to give us a new surgery. Sir Joseph Lister, to whom we chiefly owe

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at the rate of 125 per 10,000, but, having improved its water supply meantime, the death rate in 1853–54 fell to 37 per 10,000.

If Thiersch lived in England to-day he would have to take out a license to kill his 14 mice in the interests of humanity—a license possibly refused, or only to be obtained after the most vexatious delays. But any housemaid might torture and kill them with arsenic or phosphorus, or Thiersch might give them to a favorite terrier, without the slighest interference, provided only it be not for a scientific or a humane object!

this knowledge, has done more to save human life and diminish human suffering than any other man of the last fifty years. Had he only made practicable the use of animal ligatures, it would have been an untold boon, the value of which can only be appreciated by doctors; but he has done far more—he has founded a new system of surgery. We may reject the spray and carbolic acid, but the surgical world, regardless of details, with few exceptions follows the principles upon which his method is founded, and humanity is the gainer by the nearly total abolition of inflammation, suppuration, secondary hemorrhage, blood poisoning, gangrene, and erysipelas, as sequels of accidents and operations; by the practicable relief from suffering and death; by operations formerly impossible; by rendering amputations and compound fractures safe and simple instead of deadly. Reflect on what each one of these brief but momentous statements means.

But we have by no means reached perfection. Lister himself, no tyro, but the great master, is still searching for further improvements. But when lately he desired to make some experiments on animals, still further to perfect our practice, so many obstructions were thrown in his way in England that he was driven to Toulouse to pursue his humane researches.

I had intended also to speak of many other practical benefits to man directly, but can only mention such important matters as the surgery of the thyroid gland, the seat of goitre; the surgery of the lungs, part of which have been removed; the surgery of the nerves; removal of the entire larynx; the remarkable researches of late years as to the periosteum in the reproduction of new bone after removal of dead or diseased bone; Bernard's important observations as to diabetes; Brown-Séquard's experiments on epilepsy; the modern extraordinary advance in nearly all the diseases of the nervous system, and a number of other discoveries, as to all of which experiments upon animals have added largely to our knowledge, and therefore to our means of diminishing suffering and saving human life. For many of these, as well as for the most judicial discussion of the vivisection question I have yet seen, I must refer you to that remarkable book, Physiological Cruelty, written, not by a man, but a woman.[1]

I had also intended to refer in detail to the splendid results of vivisection in relieving the sufferings of animals, and in preventing enormous pecuniary loss to man. We are only beginning to see that vivisection is as humane to animal life and suffering as it is to human, and that for financial reasons as well as humane motives it is of the utmost importance to the State that such diseases as cattle plague, splenic fever, chicken cholera, swine plague, and others should be eradicated. Vivisection has shown us how this may be done, and has so conferred upon animals, too, the boon of life and health. For all this, however, I must refer you to the recent admirable lecture by Prof. Robert Meade Smith, of the University of Pennsylvania.[2]

One subject, however, is so recent and of such interest, both to man and animals, that I must not pass it over—I mean that justly dreaded disease hydrophobia. Thanks to vivisection, its abolition in the near future seems no longer to be a matter of doubt.

Within the last three years Pasteur has announced that, by passing the virus through the monkey, he has been able to protect dogs from

[1] See also the just issued Life and Labors of Pasteur.

[2] Reprinted from the Therapeutic Gazette, November, 1884.

hydrophobia by vaccination with his weakened virus. The French Government recently appointed an eminent scientific commission to report on the alleged discovery.[1] Pasteur furnished them with 23 vaccinated dogs. These 23, and 19 others unprotected, were all inoculated from rabid animals. Of the 19 unprotected, 14 died. Of the 23 protected dogs, one died of diarrhea, and all the others escaped. It has yet to be tried on a man suffering from hydrophobia, but should our reasonable hopes be realized, what a boon it will be.[2]

ADDITIONAL STATEMENT OF DR. ALBERT LEFFINGWELL, OF AURORA, N. Y.

For one who loves science and who believes that we can render her no greater homage than by speaking the truth in all that concerns her, it is not easy to refer to the strange indifference to precision and accuracy, the peculiar unconcern as regards facts, the mocking allusion to the dead that characterize the statement of Dr. Mary Putnam-Jacobi. It is doubtful if any surgeon of the nineteenth century lifted his profession into higher eminence than the late Lawson Tait, of England. He was the first, or among the first, of surgeons to perform upon women a certain dangerous operation for one hundred times in succession without losing a single patient; and it is his fate, less than a year after immortality has claimed him, to be calumniated by one of the sex for whom he did so much as a man who "*devoted his life to the vivisection of women.*"

Carelessness and inaccuracy are stamped upon nearly every sentence of her statement. In the references she has made to my own writings not a single clue is afforded, not a single reference is given whereby the reader may test the accuracy of her assertions. References are made to knowledge possessed by "the doctors of Molière" two and a half centuries ago; but a lady with the acquaintance which Dr. Jacobi has of vivisection must know that, whatever may have been the opinion of the doctors of Molière about opium, morphia is *not* an anæsthetic, as Claude Bernard demonstrated in his Leçons de Physiologie Opératoire (p. 115). She asserts that Dr. Beyer was severely condemned "for an experiment on artificial respiration because morphia was used instead of ether or chloroform," in complete ignorance of the fact that, so far from being "an experiment" or involving "a single dog," the experiments were at least forty on dogs and other creatures; and instead of being merely "an experiment on artificial respiration," Beyer's vivisections involved prolonged dissections, including the complete isolation of the heart, before which "*the whole front and sides of the thorax are cut away.*"

To demonstrate the utter unreliability of Dr. Putnam-Jacobi's allusions to facts, I desire to give somewhat more precisely an account of the experiments which she described as "an experiment on artificial respiration." Beyer's article is entitled, "Direct action of atropine,

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[1] Medical News, August 30, 1884.

[2] Since this address was written this has been used in hundreds of cases in man. Up to the time of Pasteur's researches of persons bitten, about 15 per cent developed the disease and *every case of hydrophobia died.* Since then, instead of a mortality of 100 per cent, the mortality of those bitten and treated by Pasteur's inoculations is in various institutions 0.95 per cent, 0.84 per cent, and even 0.5 per cent.—*American Text-Book of Surgery, 3d ed., p. 134.*

etc., on the heart of the dog, terrapin, and frog," by H. G. Beyer, M. D., M. R. C. S., of the section materia medica, United States National Museum, and may be found in the American Journal of Medical Sciences for April, 1887. Beyer's description of his method (somewhat condensed) is this:

ISOLATION OF THE HEART OF THE DOG.

The animal having been placed under the influence of morphia, is fastened to a dog holder, tracheotomy is performed, and a canula introduced into the trachea. The external jugular vein is now dissected out and a canula filled with normal salt solution introduced, with its open end pointing to the heart. Through the latter canula about half a dram of a 1 per cent solution of *curare* is injected, after which artificial respiration is commenced. The vagi are now found and carefully divided. Canulas are introduced into the cardiac end of both common carotids, the arteries being clamped on the cardiac sides of the canula. The first two pairs of costal cartilages are *now cut away*, together with the small piece of sternum which they embrace. Then the two internal cammary arteries are ligated just as they pass forward from the subclavian toward the breast bone. *The whole front and sides of the thorax are now cut away*, and the right subclavian artery dissected out and tied. Proceeding now to the left of the chest, the subclavian artery of the left side is ligated. * * * Finally a canula, previously filled with warm blood, is tied into the superior vena cava and the animal is prepared to be transferred into the warm, moist chamber in which it is to remain during the experiment.

And all this, involving the cutting away of the whole front of the dog's chest, is called by Dr. Mary Putnam-Jacobi "an experiment on artificial respiration."

Beyer reports no less than ten of these experiments on dogs (besides others on inferior species of animals), and tells us, moreover, that "in presenting these experiments only those will be given which are typical." Here are two or three cases of what Dr. Jacobi deems it in accord with scientific accuracy to refer to as "an experiment."

Experiment 21: Small adult dog, under morphia and curare. Heart isolated at 2.38 p. m. Death at 4.05 p. m. (Lived, therefore, one hour and twenty-seven minutes.)

Experiment 26: Small adult dog, under morphia and curare. Heart isolated at 3.20 p. m. Death at 3.31 p. m.

Experiment 40: Small adult dog, under morphine and curare. Heart isolated at 3.40 p. m. Death at 4.08 p. m.

I do not refer to these experiments of Beyer—I have never hitherto referred to them—as examples of "cruelty." It was the falsehood that dared to deny their existence to which my protest was first directed. (Senate Doc. No. 78, p. 9.) It is against the self-confidence of ignorance, the utterly misleading and untrue assertions of those who assume to criticize without knowledge of the facts that I protest again. All that science demands is the simple truth.

LETTER FROM PRESIDENT ELIOT, OF HARVARD UNIVERSITY.

The committee has received the following letter from the president of Harvard University:

HARVARD UNIVERSITY.
Cambridge, March 19, 1900.

DEAR SIR: I observe that a new bill on the subject of vivisection has been introduced into the Senate, bill No. 34. This bill is a slight improvement on its predecessor, but is still very objectionable. I beg *leave to state very briefly* the objection to all such legislation.

(1) To interfere with or retard the progress of medical discovery is an inhuman thing. Within fifteen years medical research has made rapid progress, almost exclusively through the use of the lower animals, and what such research has done for the diagnosis and treatment of diphtheria it can probably do in time for tuberculosis, erysipelas, cerebro spinal meningitis, and cancer, to name only four horrible scourges of mankind which are known to be of germ origin.

(2) The human race makes use of animals without the smallest compunction as articles of food and as laborers. It kills them, confines them, gelds them, and interferes in all manner of ways with their natural lives. The liberty we take with the animal creation in using utterly insignificant members of them for scientific researches is infinitesimal compared with the other liberties we take with animals, and it is that use of animals from which the human race has most to hope.

(3) The few medical investigators can not, probably, be supervised or inspected or controlled by any of the ordinary processes of Government supervision. Neither can they properly be licensed, because there is no competent supervising or licensing body. The Government may properly license a plumber, because it can provide the proper examination boards for plumbers; it can properly license young men to practice medicine, because it can provide the proper examination boards for that profession, and these boards can testify to the fitness of candidates, but the Government can not provide any board of officials competent to testify to the fitness of the medical investigator.

(4) The advocates of antivivisection laws consider themselves more human and merciful than the opponents of such laws. To my thinking these unthinking advocates are really cruel to their own race. How many cats or guinea pigs would you or I sacrifice to save the life of our child or to win a chance of saving the life of our child? The diphtheria antitoxin has already saved the lives of many thousands of human beings, yet it is produced through a moderate amount of inconvenience and suffering inflicted on horses and through the sacrifice of a moderate number of guinea pigs. Who are the merciful people—the few physicians who superintend the making of the antitoxin and make sure of its quality or the people who cry out against the infliction of any suffering on animals on behalf of mankind?

It is, of course, possible to legislate against an improper use of vivisection. For instance, it should not be allowed in secondary schools or before college classes for purposes of demonstration only; but any attempt to interfere with the necessary processes of medical investigation is, in my judgment, in the highest degree inexpedient, and is fundamentally inhuman.

Very truly, yours, C. W. ELIOT.

Hon. JAMES MCMILLAN.

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